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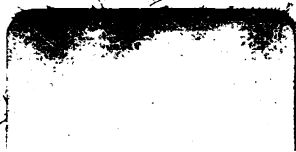
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HEARINGS

BEFORE THE SUBCOMMITTEE OF THE COMMITTEE
ON APPROPRIATIONS
HOUSE OF REPRESENTATIVES

CONSISTING OF

Messrs. SWAGAR SHERLEY (CHAIRMAN), GEORGE W. RAUCH,
EUGENE F. KINKEAD, JOHN W. DWIGHT,
AND JAMES W. GOOD

IN CHARGE OF

THE FORTIFICATION APPROPRIATION BILL

*U.S. Congress, House, Committee on
Appropriations.*



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FORTIFICATION APPROPRIATION BILL.

HEARINGS CONDUCTED BY THE SUBCOMMITTEE, MESSRS. SWAGAR SHERLEY (CHAIRMAN), GEORGE W. BAUCH, EUGENE F. KINKAD, JOHN W. DWIGHT, AND JAMES W. GOOD, OF THE COMMITTEE ON APPROPRIATIONS, HOUSE OF REPRESENTATIVES, IN CHARGE OF THE FORTIFICATION APPROPRIATION BILL, ON THE DAYS FOLLOWING, NAMELY:

FRIDAY, JANUARY 12, 1912.

CHARACTER AND SCOPE OF THE FORTIFICATION APPROPRIATION BILL.

Mr. SHERLEY. Inasmuch as the chairman is the only member of the subcommittee that has had previous experience with this bill, it would seem proper that some statement should be made as to the general character of the bill, the subjects it embraces, and the departments of the Government through which the moneys appropriated are expended. I have had prepared at the War Department, through the kindness of Gen. Wood, Gen. Crozier, and other gentlemen, a rather complete statement of the bill, and I shall now make a general statement of that in order that the new members may have some basic idea of the bill.

By the act of Congress approved March 3, 1885, the President was directed to appoint a board to formulate plans for seacoast defenses. This board later became known under the name of the Endicott Board, and its report, transmitted to Congress on January 23, 1886, formed for many years the guide from which the Secretary of War determined the ports that should be fortified and the amount and type of armament required for each. It will be understood that these plans required many modifications of detail in accordance with the development of commercial and strategic importance of the different ports and emplacements and changes in modern armament. In addition, no provision was made for reserve ammunition, probably due to the fact that the development of satisfactory powder was at that time in an experimental stage. On March 5, 1906, the President of the United States transmitted a message to the Congress in which he inclosed a report of the National Coast Defense Board, which had been appointed by him on January 31, 1905. This report modified and brought up to date the report of the Endicott Board and added a scheme for the fortifications of the insular possessions of the United States, and is usually referred to as the Taft Board report. In pursuance of the plans and projects recommended in that report estimates are submitted annually by the Secretary of War of the sums needed to carry on the work, and the items containing such estimates constitute the bill as submitted to this committee.

It should be stated in passing that the estimates for the fortification of the Panama Canal are submitted as a part of the general canal estimates and are carried in the sundry civil bill.

These items of appropriation may be roughly divided into three general classes, namely:

1. Fortification of seacoast forts, including ammunition.
2. Supply of Field Artillery material, including ammunition.
3. Miscellaneous items related to the above but not strictly forming parts thereof.

The first classification can be subdivided into three items: (*a*) Items pertaining to new armament and installation, including reserve ammunition; these items embrace guns, gun carriages, emplacements, sites for defense, electrical installation, searchlights, sea walls, submarine-mine structures, fire-control instruments and structures, and ammunition; (*b*) items pertaining to maintenance, repair and alterations of property embraced in subdivision *a*, except ammunition; and (*c*) items pertaining to seacoast target-practice ammunition, including appliances for same, and subdivisions *a* and *b* should also be segregated according as they relate to continental United States and the insular possessions.

Now, under these three subdivisions of the first general division there has been heretofore appropriated for continental United States, including practice ammunition used in the insular possessions, \$118,744,089.68. Of this amount, under subdivision *a* items pertaining to new armament and installation, there has been appropriated \$86,811,050.25; items relating to reserve ammunition, \$14,832,885.98. Under subdivision *b*—that is, the item for maintenance, repair and alteration—there has been appropriated \$12,686,095.43. Under subdivision *c*, seacoast target-practice ammunition, there has been appropriated the sum of \$4,414,058.

Under subdivisions *a* and *b* there has been appropriated for the insular possessions, \$9,544,434.09. This total includes under subdivision *a*, items pertaining to new armament and installation, \$14,651,589.09; items for reserve seacoast ammunition, \$1,700,000. Under subdivision *b* for maintenance, repair and alteration, there has been appropriated, \$192,845. So that the total of appropriations for both continental United States and the insular possessions, under heading No. 1, amounts to \$135,288,523.75.

The second general classification, to wit: Supply of Field Artillery material, including ammunition, can also be subdivided into three classifications similar to that of item No. 1. In other words, (*a*) those pertaining to new material, including reserve ammunition; (*b*) those pertaining to maintenance, repair, and alteration; and (*c*) those pertaining to target-practice ammunition.

The total appropriated has been \$7,030,200. The total of the above that is included under the subdivision *a*, new material, including reserve ammunition, is \$6,063,800, of which \$1,501,600 was for such reserve ammunition, leaving \$4,562,200 as the amount that has been appropriated for new material. Of this latter sum \$580,000 is counted as being for new material, though it is literally for the purpose of making new batteries out of old ones.

Under subdivision *b*, for maintenance, repair, and alteration, there has been appropriated \$306,000. Under subdivision *c*, for target-practice ammunition, there has been appropriated \$660,400.

The third general classification, to wit, miscellaneous items related to the preceding but not strictly forming parts thereof, consists of the following items, totaling appropriations of \$16,034,036:

Board of Ordnance and Fortification.....	\$2, 425, 003
Proving ground, Sandy Hook.....	1, 497, 178
Machine guns not used for seacoast defenses.....	385, 082
Ordnance establishments, buildings, gun factory, powder factory, etc.....	2, 997, 042
Machinery for ordnance establishments.....	451, 097
Purchase of materials abroad, Board of Ordnance and Fortification.....	100, 000
Experimental guns, carriages, and ammunition.....	919, 603
Testing experimental guns and carriages.....	167, 500
Implements, equipments, alteration, and maintenance of old armament.....	133, 896
Field material and ammunition of old designs.....	5, 374, 959
Field material and ammunition of old designs (national defense fund).....	1, 341, 383
Returned to Treasury.....	241, 293

I have had prepared a statement showing the funds that it is estimated by the War Department will be necessary for the completion of the various projects heretofore outlined.

Under the first classification, and for continental United States only, it is estimated that the items coming under subdivision *a* will be as follows:

For construction of emplacements.....	\$9, 702, 130. 00
Sites for defenses.....	1, 455, 900. 00
Electrical installations.....	4, 652, 769. 00
Searchlights.....	2, 200, 000. 00
Sea walls.....	1, 524, 845. 00
Submarine-mine structures.....	377, 406. 00
Fire control.....	4, 599, 554. 00
Guns and carriages.....	7, 378, 300. 00
Reserve ammunition.....	7, 750, 266. 63
Submarine mines.....	1, 036, 505. 00
Total.....	40, 677, 675. 63

Under subdivision *b* as follows:

ALTERATION.

Modernizing emplacements.....	\$1, 024, 201
Alteration of armament.....	2, 287, 170
Total.....	3, 311, 371

Making, under the first general division for continental United States, a grand total of \$43,989,046.63.

In addition to the above it is estimated that there will be annually required \$1,000,000 for maintenance, repair, and minor alterations, and \$425,000 for target practice.

For the insular possessions, under subdivision *a* of the first classification, the following is the estimate for the completion of projects:

For construction of emplacements.....	\$4, 174, 200. 00
Electrical installation.....	266, 528. 00
Searchlights.....	379, 400. 00
Submarine-mine structures.....	400, 000. 00
Fire control.....	550, 000. 00
Guns and carriages.....	2, 021, 150. 00
Reserve ammunition.....	4, 293, 493. 80
Submarine mines.....	322, 150. 00
Total.....	12, 406, 921. 80

It is estimated that no appropriations will be required under subdivision *b* for alteration or under subdivision *c* for target practice.

In addition to the above, it is estimated that \$76,585 will be annually required for maintenance, repair, and minor alterations, plus a proportionate increase due to the installation of new armament as it is supplied.

Under the second general classification, first noted, it is estimated that items coming under subdivision *a* will be as follows: For new matériel, including funds for the alteration of 3.2-inch batteries, \$15,240,686.80; for reserve ammunition, \$22,031,329.47, making a total of \$37,262,016.27.

In addition to the above, it is estimated that there will be required annually \$45,000 for alteration, maintenance, and repair and \$130,000 for target practice.

It should be stated in connection with the foregoing items for field-artillery matériel and ammunition that it is also estimated by the War Department that for such matériel and ammunition for the use of the militia there will be required a total of \$10,879,278, for which latter sum, however, it is expected that estimates will be submitted and appropriations carried in the Army bill.

In the present estimates there is asked, under the first general division for continental United States, subdivision *a*, new matériel, etc., \$822,000; under subdivision *b*, maintenance, repair, etc., \$997,000; and under subdivision *c*, target-practice ammunition, \$425,000, making a total of \$2,244,000. In addition to this, there is asked authority for the transfer of balances amounting approximately to \$165,992.

In the insular possessions, under subdivision *a*, there is asked for new matériel, ammunition, etc., \$1,993,414, and under subdivision *b*, maintenance, repair, etc., \$76,585, making a total of \$2,069,999, and a grand total of ~~\$14,476,926.80~~ for both continental United States and the insular possessions under the first general division.

313.999

Under the second general classification there is asked, under subdivision *a*, new matériel, etc., including alteration of 3.2-inch batteries, \$2,605,000; under subdivision *b*, maintenance, repairs, etc., \$45,000; under subdivision *c*, target-practice ammunition, \$130,000, making a total of \$2,780,000.

Under the third general division there are asked the following items:

Current expenses, ordnance proving ground, Sandy Hook, N. J.-----	\$56,200
Expenses of officers at the proving ground and compensation of draftsmen -----	18,700
Board of Ordnance and Fortification.-----	50,000
Total -----	124,900

The funds appropriated under the fortification acts are expended by or under the supervision of the Chief of Ordnance, the Chief Signal Officer, and the Chief of Engineers. In general terms the Chief of Ordnance has charge of those items pertaining to seacoast cannon, including their carriages, sights, implements, and equipments; mountain, field, and siege cannon, including their carriages, sights, implements, and equipments; ammunition for seacoast cannon; ammunition for mountain, field, and siege cannon; ammunition, subcaliber guns, and other accessories for seacoast artillery practice; ammunition, subcaliber guns, and other accessories for

mountain, field, and siege artillery practice; alteration and maintenance of seacoast artillery; alteration and maintenance of mobile artillery; current expenses of the ordnance proving ground, Sandy Hook, N. J.; necessary expenses of officers at the proving ground, and compensation of draftsmen. In addition he has charge of the accounts, although not of the disbursements, pertaining to submarine mines, and the Board of Ordnance and Fortification, and expends the funds allotted him by the Secretary of War for fire-control instruments.

The Chief Signal Officer has charge of the operation and maintenance of fire-control installation at seacoast defenses and the expenditure of such funds as may be allotted him by the Secretary of War for the procurement of wiring and instruments for communication service from the appropriations for fire control.

The Chief of Engineers has charge of the construction, maintenance, repair, and modernization of emplacements for seacoast armament; installation and replacement of electric light and power plants and searchlights at seacoast fortifications; procurement or reclamation of land for sites for fortifications; preparation of plans for fortifications; tools, electrical, and engine supplies for operating electric light and power plants in seacoast batteries and reserve lights therefor; construction, maintenance, and repair of sea walls and embankments; construction, preservation, and repair of structures for torpedo defense; land defenses of seacoast fortifications, exclusive of electrical communications and armament; and the expenditure of such funds as may be allotted him by the Secretary of War from fire-control appropriations for construction of fire-control stations and accessories and purchase of lands and rights of way.

The estimate for fire-control stations and accessories, electrical communications, and range finders, and other instruments for fire control at the fortifications is submitted by the Chief of Coast Artillery, and the appropriation when made is carried on the books of the disbursing officer of the War Department, expenditures being made by the Chief of Ordnance, the Chief Signal Officer, and the Chief of Engineers in accordance with allotments made them by the Secretary of War for particular purposes. The estimate for submarine mines is prepared by the Chief of Coast Artillery and disbursed under his supervision; the accounts are kept by the Chief of Ordnance.

I have asked the Chief of Staff, Gen. Wood, to be present and to make such statement as he sees fit, touching the general subject matter of the bill and the policy that has been adopted by the War Department in connection therewith and any other suggestions that he may care to submit.

FORTIFICATIONS IN THE UNITED STATES AND THE INSULAR POSSESSIONS.

STATEMENT OF MAJ. GEN. LEONARD WOOD, CHIEF OF STAFF, UNITED STATES ARMY.

Gen. Wood. In regard to the seacoast fortifications, their construction, armament, and ammunition, the department is most anxious to complete, as rapidly as possible, the seacoast defenses in the Philippine Islands, the defenses in the Hawaiian Islands, and also the de-

fenses in the Panama Canal Zone. These are, in the opinion of the department, the three most important pieces of work in which we are at present engaged; also the completion of fire control in the United States for the works completed and the acquisition of a reasonable amount of reserve ammunition. I feel, however, that greater attention should be given to the completion of work in the Philippine Islands, Canal Zone, and the Hawaiian Islands than anywhere else; and if reductions have to be made in our estimates, rather than reduce the estimates for the above works that the work in the United States could be reduced to a basis of mere maintenance, with such allotment for ammunition as you can give us. This, with the appropriations which we have asked for in order to complete the work now going on in the Philippine Islands and in the Hawaiian Islands, should be as large as possible. This is my opinion and that of others in the department in reference to seacoast defenses.

In regard to that portion of the bill which relates to Field Artillery, I feel that we are in a particularly critical condition. We have constructed and authorized 160 batteries of 4 guns each (2 of these batteries are of 3.8-inch guns, which are not of the approved system) and are estimating for a total of 23 batteries this year—13 for the Regular Army (10 new and 3 converted) and 10 for the militia, with a certain amount of ammunition. The amount for both guns and ammunition is larger than we have heretofore asked for, but is a very modest estimate in comparison with our actual needs. The sum estimated for batteries necessary to properly equip the Regular Army is (under the fortification bill) \$1,105,000; for batteries necessary to properly equip the militia (under Support of the Army) \$1,600,000; for ammunition for the Regular Army (fortification bill) \$1,500,000; for ammunition for the militia (Support of the Army) \$1,500,000. If this allotment is made and the 23 batteries are built, 59 batteries will still be required to provide sufficient field artillery for the Regular Army and the militia. This does not include reserve pieces. The above figures do not include any artillery for Volunteers. To construct the guns still required will cost, with certain necessary caissons, about \$7,800,000; to provide the necessary field allowance of ammunition for these guns will cost \$18,500,000; the matériel for the ammunition columns and other supplies will cost approximately \$8,000,000.

I put these figures in simply to emphasize the fact that we have cut our estimates to what we consider the lowest limit of safety. We have put the number of guns per 1,000 rifles and sabers at a less number than any other great power.

Mr. SHERLEY. What proportion of guns was carried in the Japanese-Russian War?

Gen. WOOD. As far as we know, the Russians have a total of 4,432 guns, of all sorts and models. At Mukden the Russian Army had 370 battalions, 142 squadrons, and 153 8-gun batteries, or about 310,000 men and 1,200 light and 300 heavy field guns, deployed over a front of 80 kilometers. This gave about 4.83 guns per 1,000 gross strength.

The Japanese were very deficient in artillery in the last war, and they have made strenuous efforts since the war to increase it. We do not know the number, but know that the increase has been material. At Mukden they had about 290,000 men, 892 light and 170

heavy pieces, or 1,062 guns to 290,000 men, or about 3.6 guns per 1,000 gross.

Mr. SHERLEY. Not only as to that war, but as to some of the late wars, like the Franco-Prussian War and the Civil War?

Gen. WOOD. I can not give you the proportion of field guns to men in the Civil War. I can only state that at the end of the Civil War there were in the possession of the Federal armies between 1,700 and 1,800 field pieces.

The French have 4.2, the Germans 4.99 per 1,000 gross.

The mobile Army of the United States has—

	Aggregate.	
	Peace.	War.
Infantry, 30 regiments.....	29,016	46,530
Cavalry, 15 regiments.....	13,865	18,585
	42,881	65,115

The number of field guns which should be provided to make this force effective is the same at peace or war strength.

The peace strength of the personnel of Field Artillery will, of course, differ from its war strength, but the guns are assigned according to the fighting strength of Cavalry and Infantry, and as these guns can not be manufactured after war is imminent they must be considered as available in any discussion of the proper organization of our Army, and this irrespective of the strength of peace personnel. Therefore, to a total war strength of 65,000 gross Infantry and Cavalry at 3.16 guns per 1,000 gross strength requires $65 \times 3.16 = 206$ guns.

The Field Artillery of the Regular Army has 144 guns, or it is at 0.699 of its needed strength to properly organize the Regular Army.

The Organized Militia has—

	Aggregate.	
	Peace.	War.
Infantry, 142 regiments.....	95,306	220,000
Cavalry, 74 troops.....	4,226	7,000
Total.....	99,532	227,000

$235 \times 3.16 = 720$ guns to properly organize as a fighting force.

The Field Artillery of the militia has 200 guns, or is deficient 520 guns.

They have 0.277 and are deficient 0.723 in field artillery.

There are no ammunition field trains for either Regular Army or militia. These trains include the reserve guns to replace casualties—10 for the Regular Army and 24 for the militia.

Summing the field artillery guns needed for existing mobile Army and militia shows:

	Guns.
Regular Army.....	$206 + 10 = 216$
Militia.....	$720 + 24 = 744$

There are 632 guns of approved type now manufactured or contracted for; $960-632=328$ guns to be provided, or the United States has now 0.658 of the field guns needed to properly equip the existing Regular Army and the militia. There are no means provided to furnish these guns with any ammunition, except that carried in their caissons with the guns. When this is exhausted, the guns have no organized supply.

	Rounds.
The number of rounds of ammunition which should be available for these guns on opening of hostilities is, approximately-----	1, 400, 000
The amount on hand or for which appropriations have been made to manufacture is-----	128, 359
Needed-----	1, 271, 641

This 128,359 rounds would, if distributed to the regular batteries and to the militia batteries, give but 261 rounds per gun. It would not fill the chests of their combat trains, and is so inadequate a supply that it would be criminal to permit this artillery to take the field with this supply.

The field guns required for a volunteer force of 300,000 Cavalry and Infantry would be, approximately, the same number as that given above for the Regular Army and the Organized Militia, which amount to 292,000 Infantry and Cavalry gross. These would need 984 guns with their proper ammunition trains, harness, horse equipments, and approximately 1,500,000 rounds of ammunition; but none of the above has been appropriated for, nor could any of this material or ammunition be obtained within a reasonable time after war was declared, no matter what appropriations were made at that time for its purchase or manufacture. In other words, any volunteer force which would be raised by the United States in time of trouble would be absolutely unprovided with the field artillery and its ammunition which would make of this volunteer force an effective fighting unit.

To sum up, we are 328 guns short of the number required to properly gun the present Regular Army and militia; we are absolutely without ammunition field trains for this force, and we have for the guns built and authorized only 261 rounds of ammunition per gun, or less than 10 per cent of the ammunition required for the guns necessary to properly equip the present Regular Army and militia. We have taken no steps to provide field artillery, field-artillery ammunition, or field-artillery ammunition trains for the 300,000 volunteers whom we should have to organize at once in case of war with a first-class power. This condition is, as I have stated in my annual report, an extremely dangerous one, and makes serious disaster inevitable in case of war with a first-class power. There is no existing deficiency in our military establishment which so urgently requires immediate appropriations as the existing deficiency in the field-artillery guns, ammunition, and ammunition trains.

The estimates for this year call for 10 new batteries and 3 converted batteries, making a total of 13 batteries for the Regular Army and 10 new batteries for the militia, or a total of 23 batteries.

Mr. SHERLEY. Your estimate this year is something over \$1,000,000?

Gen. WOOD. Yes; before this committee \$1,105,000 for guns and \$1,500,000 for ammunition for the Regular Army; and before the

Military Committee \$1,600,000 for guns and \$1,500,000 for ammunition for the militia. We really are more exercised about the shortage of field artillery ammunition. We must also finish up the fortification work in the Philippines.

The principal purpose of the defense of Manila Bay is to provide a safe harbor for a fleet to assemble, coal, and repair, if necessary; and the defenses there ought to be pushed ahead and made secure.

UNDER THE ENGINEER DEPARTMENT.

STATEMENTS OF BRIG. GEN. W. H. BIXBY, CHIEF OF ENGINEERS, AND LIEUT. COL. EDWARD BURR, ASSISTANT TO THE CHIEF OF ENGINEERS, U. S. ARMY.

Mr. SHERLEY. On page 3 of this bill appears an item as follows: "For modernizing older emplacements," with an estimate for \$100,000. That is the estimate submitted by the Engineer Department. We will be glad to hear from you, Gen. Bixby, or Col. Burr.

Gen. BIXBY. Those questions which take up the appropriations and the changes, I prefer to have Col. Burr answer, because that is something to which he has given special attention.

MODERNIZING OLDER EMPLACEMENTS.

Col. BURR. The item for modernizing older emplacements is one, as the term indicates, for bringing up to date the emplacements built in the past, some of them, practically, 20 years ago, so that they may be in shape to meet the conditions of service of modern artillery, in which there has been a tremendous advance in that same time.

We have estimates on our books for a good many items necessary to that end. The particular piece of work that is the basis of the estimate carried in the Book of Estimates this year is one necessary to meet an advance and improvement in projectiles of heavy calibers. Within recent years the points of all projectiles, even for small arms, have been considerably elongated. This has resulted, as Gen. Crozier can explain better than I can, in a considerable increase in artillery efficiency. In a large number of our emplacements hoists are necessary to lift the projectile from the lower floor to the upper floor or to the level of the gun platform on which the gun is loaded. Our hoists were built and installed to handle the old type of shorter projectile. It will be necessary to remodel and modernize the older type of hoist and probably replace some of them in order to permit the handling of this longer and more effective projectile.

Mr. SHERLEY. Is it not possible now, although perhaps not as efficiently, to handle this modern ammunition?

Col. BURR. It would be possible to handle it with hand appliances, but not with power appliances. These projectiles run in weight up to a thousand pounds, and in a large percentage of our batteries are stored at a lower level than the loading platform, and they must be brought up from the magazines to that level. We have provided power hoists for that purpose and we have also provided—and this answers the question—emergency appliances for hand hoisting in

case the power hoists become disabled for any reason. But these emergency appliances will nothing like meet artillery conditions as to rapidity of fire as they exist to-day. These hoists will not accommodate the longer projectile in some cases, and, while in other cases they might accommodate them, we do not consider the hoists safe to carry them. That is the principal item which we have in prospect under modernizing emplacements. The total preliminary estimate for that work is about \$116,000. We originally submitted to the Secretary of War estimates for \$250,000 for modernizing older emplacements, but as the estimates appear before this committee they are only \$100,000.

MR. SHERLEY. Is it estimated that this \$100,000 will do all of the work?

COL. BURR. To do part of the work of remodeling ammunition hoists.

MR. SHERLEY. I understood the character; but I mean the places and the amount.

COL. BURR. The definite distribution or allotment of that work from harbor to harbor has not been made in advance of the actual appropriation. Our plans contemplate, first, the completion of this work in the heavier batteries on the Pacific coast and then to take up the same work as the funds become available on the more important harbors on the Atlantic coast. The work is larger in amount on the Atlantic coast, except in San Francisco on the Pacific coast, because the batteries of the more important harbors on the Atlantic coast are older and therefore of older type and have older types of appliances.

MR. SHERLEY. Is the ammunition at these different fortifications all of the new type or is a large part of it of the older type?

COL. BURR. So far as I understand it, at the present time most of that which is on storage at the batteries is of the older type, but I believe the Ordnance Department is prepared to deliver—Gen. Crozier may correct me if I am wrong—for the heavier batteries a part of the supply in the longer type as soon as and perhaps sooner than these mechanical appliances for hoisting can be altered by the Engineer Department.

GEN. CROZIER. We propose to alter a great many of the older type. In regard to this projectile about which Col. Burr has spoken, by changing the cap which is on it now, which you know assists in the penetration of armor, to another cap which will be effective in assisting in the penetration of armor, better results are obtained; we will change the point into a longer tapering point, which is more advantageous.

MR. SHERLEY. To the extent, however, that the older ammunition is used the present emplacements are sufficient?

COL. BURR. Yes.

MR. SHERLEY. I notice in a statement submitted to me that there is an unallotted balance of \$7,507.29 under this head.

COL. BURR. Yes; \$7,507.29. I do not know the details of that particular balance; it is undoubtedly a balance left from the appropriation for modernizing.

MR. SHERLEY. It is an available balance?

COL. BURR. Yes, sir.

GEN. BIXBY. On November 30.

Mr. SHERLEY. Well, in point of fact, is it an available balance at this time?

Col. BURR. I presume it is an available balance at this time; but I can not say definitely that none of that balance has been allotted for work since November 30.

Mr. SHERLEY. All told, you have had for this purpose a total appropriation of \$965,261.36, as shown by my statement.

Col. BURR. Yes; for modernizing older emplacements.

Mr. SHERLEY. Now, I find a statement here as to certain other expenditures, among which appears an item of \$129,056.36 for ammunition hoists. Does that represent the total sum that has been used in modernizing emplacements for hoists?

Col. BURR. No; it does not represent the total expenditure for ammunition hoists. The original type of ammunition hoist was a rather simple machine. As Artillery efficiency and speed of service increased it was found ineffective to meet the more rapid service. Therefore, a type of hoist that would meet artillery requirements was developed and installed. In some instances the hoists were built on contracts made by the officers in local charge of the work and installed by him, the funds being allotted to him and charged to the district direct. It was thought better, however, to have all of these hoists of one type, built under one contract and supervised by one officer, the hoists being sent to the districts for installation. That situation explains this amount expended for hoists which were built under this one contract, and, without going considerably back through our accounts, Mr. Chairman, it would be somewhat difficult to distribute that as between the different harbors, as the large majority of the funds have been distributed; however, it can be done if desired.

Mr. SHERLEY. Is this language in the same form as in previous years?

Col. BURR. I think it is the same language; we have made no change, because if we had there would be a note covering it.

Mr. SHERLEY. It all seems to be in italics, and that indicates new language.

Col. BURR. That is new, because it did not appear in the last bill; we had no appropriation in the last bill under that head.

CONSTRUCTION OF FIRE-CONTROL STATIONS AND ACCESSORIES.

(See also p. 131.)

Mr. SHERLEY. The next item is for the construction of fire-control stations and accessories, including purchase of lands and rights of way, etc., for which you ask an appropriation of \$200,000.

Col. BURR. The fire-control estimate, as a whole, is one which was prepared by the Chief of Coast Artillery and not by the Chief of Engineers, but it is inserted by us and is under the head of the Engineer Department. However, in that matter we have simply followed instructions from the Chief of Staff.

Mr. SHERLEY. This estimate provides funds for the Engineer Department, Signal Corps, and Ordnance Department, as I understand it.

Col. BURR. Yes.

Mr. SHERLEY. Are you able to state what proportion of the \$200,000 it is expected will be allotted to the Engineers?

Col. BURR. I have an impression in my mind that the Engineer portion of the expenditure for fire control amounts to about 60 per cent of the total cost of the installation. If that is not correct, I will make a change in the notes. Now, just what proportion the Engineer Department would be allotted from this \$200,000, if appropriated, we can not say at this time, because the amount to be allotted to the Engineer Department is based on detailed estimates made by the Engineer Department after the expenditure of these funds is determined by the War Department, and a detailed plan of installation has been decided upon.

Mr. SHERLEY. I notice in the note in the bill the following:

The Taft Board estimated in its report of February 1, 1906, that \$572,500 was necessary for fire-control purposes in the defenses of Narragansett Bay. The \$200,000 included in this estimate is to cover at least the most important part of the fire-control installations required for these defenses.

Is it your understanding that that is the purpose to which this \$200,000 estimate is to be put?

Col. BURR. It is my understanding, but it is only general information derived largely from the last hearing upon this same bill, that after completing the fire-control installation at Fort Monroe the War Department contemplates taking up as next in importance the installation for Narragansett Bay. If the sums previously appropriated and now available are sufficient for the Fort Monroe installation, I presume it is safe to say that the next appropriation will be applied, so far as it will go, to the Narragansett Bay installation. However, Mr. Chairman, that is a matter which the Chief of Coast Artillery, representing the Chief of Staff, knows about, and from whom first-hand information should be obtained.

Mr. SHERLEY. Now, in a statement submitted to the committee it appears that the amount that will be needed for the fire control at Narragansett Bay is \$616,861, whereas the note in the bill states that \$572,500 is needed. Can you explain this discrepancy?

Col. BURR. No, sir; the figures were not made up by the Engineer Department.

Mr. SHERLEY. I note also that you have a balance in the fire-control appropriation; can you state just what it is?

Col. BURR. For fire control in the United States the available unallotted balances in the Engineer Department amount to \$1,459.34. Available and unallotted does not mean expended, of course.

Mr. SHERLEY. I have a statement here showing that there is a balance, unallotted, of \$1,904.34, the statement being submitted as of November 6.

Col. BURR. Yes; but the figure that I have given you is of November 30. The statement made up complete of that date, so far as the Engineer Department is concerned, shows a balance of \$71,136.26 total unexpended, as available allotted; \$56,558.59 as available unallotted, the figure previously stated, and total available unexpended, whether allotted or unallotted, \$58,017.93, on November 30 in the Engineer Department. Now, I think I am correct in saying, and if not I will correct it in the notes, that the larger part of that available balance allotted is made up of the balances of funds allotted for the

work in New London now in progress but uncompleted. By New London I mean the eastern entrance to Long Island Sound.

Mr. SHERLEY. It is your idea that about two-thirds of the estimates submitted should be allotted to the Engineer Department?

Col. BURR. About that amount; it varies from point to point. In other words, the engineer portion of the work, including structures and conduits, involves approximately 76 per cent of the total.

Mr. SHERLEY. You have, of course, no information as to the unallotted balances held by the Signal Corps under this head?

Col. BURR. I do not know them at all.

Mr. SHERLEY. What is the condition of the fire control at Narragansett Bay?

Col. BURR. So far as any system is concerned it is incomplete.

Mr. SHERLEY. Of course, you have a system at all of these places?

Col. BURR. I am speaking only from general information, because I have no detailed information at hand on the subject, but it is incomplete in the sense that the fire-control system does not cover all of the existing batteries, and what fire-control system does exist is extemporized in many instances or pertains to an old system.

Mr. SHERLEY. What do you mean by "extemporized"?

Col. BURR. In the fire-control system, as a whole, even where a modern system is completely installed, artillery instructions require that the local commanding officer shall make preparations for utilizing an emergency system and emergency appliances in case of accidents to the complete and standard system. These emergency systems are, of course, not so effective as the complete standard system, but they serve to give fire-control and range-finding results that are better than nothing. But on that entire matter of fire control the Chief of Coast Artillery is the authority for information at first hand.

Mr. SHERLEY. In the note explaining the estimate of \$100,000 for last year, all of which was allowed, it is stated that this money was sought for Narragansett Bay, Galveston, Pensacola, and Hampton Roads. In point of fact, was not all of that \$100,000 allotted for work at Narragansett Bay?

Col. BURR. Not so far as the Engineer Department is concerned. I think that note covered the original estimate that went into the Book of Estimates. As the estimates were originally prepared in the War Department, the figures were much larger than \$100,000, and if large enough would have been utilized for the fire-control installation at the points named and probably in the order in which they were named. I notice that is re-marked by the chairman of the subcommittee.

Mr. SHERLEY. Now, you speak of the system as being a temporary one. Aside from the risk of its being put out of commission during hostilities it is actually sufficient and efficient for the control of the guns, is it not?

Col. BURR. Not for all of them, but without more fully informing myself in regard to what actually exists at Narragansett Bay I can not state a definite opinion on that.

Mr. SHERLEY. You do not know how great the need for this estimate at Narragansett Bay is?

Col. BURR. No; I do know that there are at Narragansett Bay some fire-control installations, commenced about the time of the

Spanish-American War, 1898 to 1902, so that there are some fire-control stations or some fire-control methods now in use for at least a part of the Narragansett Bay armament.

Mr. SHERLEY. In point of time there are no old fire-control systems?

Col. BURR. No; not as time goes—that is, systems 10, 12, or 15 years old are not old in point of time, but installations made in 1898 are antiquated at this time. But that does not mean that some parts of it can not be utilized. For instance, at Fort Monroe in installing a complete standard installation they are using, so far as they are applicable, parts of the earlier installation of, say, 10 years ago.

Mr. SHERLEY. In point of time there are none that are not now being used, are there; none so old as to be unavailable for actual use?

Col. BURR. That is so, I presume; but they do not fully meet the requirements of the system as now developed by the Coast Artillery.

Mr. SHERLEY. I understand that they are not what you gentlemen term modern systems.

Col. BURR. No; part can be used as elements of a modern system, but the main point with regard to them all, as I understand it, is simply this—that at none of the forts, excepting those which have been completely equipped with a modern system, is there a fire system which will cover all of the batteries in the harbor. When the fire-control systems were under installation, say, 12 years ago, there was work done here and there in a number of harbors, but the systems were not completely installed in any one harbor. However, the present policy of the War Department is to fully complete a system in one harbor before moving on to the next, and so far as you go you will have a complete system.

Gen. BIXBY. You wanted to know the ratio of the estimates of the Engineer Department for fire control. Of the total estimates of the Taft Board in the United States, amounting to \$9,463,053, 76 per cent was covered by estimates for the Engineer Department; that is just about three-fourths.

Mr. SHERLEY. Do you know what the total estimate is for fire control, or appropriations necessary to modernize and complete all fire controls for all of the existing fortifications, and also for all contemplated under the fortification scheme as it now exists?

Col. BURR. We have not the figures assembled in that way; we have estimates—and they were included in the statement that was furnished to you—of the amount necessary to complete the installation at all the fortified harbors; but the amounts necessary for the fire-control installation for batteries now completed is not separate from batteries not yet completed; I note that has not been stated.

Mr. SHERLEY. The statement shows that for continental United States, if the present plans for fortifications are carried out in full, the amount is \$4,599,554. Now, if I understand you correctly, you are not able to state how much of that sum will be necessary for fire control for existing batteries?

Col. BURR. I have not separated the figures along those lines; it can be done if desired. It might be stated in that connection, though, that when the fire-control system is installed for any particular harbor complete, that completeness extends only to existing batteries. The installation, so far as it may be necessary for batteries not yet constructed, is not made prior to the construction of the batteries. There are some elements of the installation to which that

does not strictly apply. One of the large elements of cost for engineer work is the construction of conduits for wires. Of course, so far as conduits may be necessary to carry wires that are to be added when additional batteries are built, space is provided, but no work is done upon any independent element that may become necessary on the construction of a new battery.

Mr. SHERLEY. I notice in the statement for the insular possessions it is estimated that \$550,000 is necessary to complete fire control there. I presume you are in the same position as to the insular possessions as you are for continental United States, and you are unable to state how much would be necessary for existing batteries in the Philippines and how much for contemplated batteries?

Col. BURR. I can not state it exactly, but the situation in the Philippines is this: That all the batteries projected for the defense of Manila Bay are under construction or completed. There are no projected batteries for the defenses of Manila Bay on which the work has not been begun. The situation in that respect is somewhat different than in the United States. All of the batteries are under construction and, except at two places, are well along toward completion.

Mr. RAUCH. There has been some doubt in the minds of those in charge of this work in the past as to the best plan of fire control. Is any of this work now in an experimental stage?

Col. BURR. I do not know that the statement just made with regard to the question of time is quite accurate. I think the situation is better described by saying that fire control is practically modern. It has been in a state of continuous development and is still in a state of continuous development. Its development as a whole, I think, in recent years is leading to simplification.

Mr. SHERLEY. Does that lead also to a lessening of expense?

Col. BURR. I think the tendency is that way. The administration appreciates the fact that the cost of fire control is high and that the less expensive it is made, provided efficiency is not affected, the sooner we will get the fire-control installation for all of our batteries that is much needed. But it has been a question of development rather than one of change.

Mr. RAUCH. I understood it was modern, and that different boards at different times have been appointed to investigate the subject.

Col. BURR. Yes.

Mr. RAUCH. With a view to ascertaining just what would be the best plan for carrying out this work.

Col. BURR. That has been entirely in the hands of the Coast Artillery, and there have been boards in the past to determine and act upon the general scheme of fire control to be installed. At the present time I think the action is more on the line of the improvement of details rather than the development of a new system or a change in the old system.

Mr. RAUCH. That is what I wanted to bring out.

Col. BURR. In addition to what I said a moment ago in regard to simplification, it might be added that there are new questions coming up all the time and some new elements being added to the installation all the time, but from the contact that I have with the system it appears quite clear to me that the authorities are keeping down such items to the minimum consistent with efficiency.

INSTALLATION AND REPLACEMENT OF ELECTRIC-LIGHT AND POWER PLANTS
AT SEACOAST FORTIFICATIONS.

Mr. SHERLEY. The next item is "For installation and replacement of electric-light and power plants at seacoast fortifications." You have an estimate of \$50,000.

Col. BURR. That estimate is in the same amount as the appropriation for the current fiscal year.

Mr. SHERLEY. Do you know just where it is expected to expend this sum?

Col. BURR. It is impossible to state fully and completely in advance, Mr. Chairman. The amount is relatively small compared to the total estimates of amounts necessary to complete the power-plant installation at all batteries existing and projected. Those figures, as I find them in my notes, are as follows: To install reserve plants at existing batteries, \$1,910,858; in proposed batteries not yet constructed, \$242,509; a total of \$2,153,367. Now, our items for power plants also include estimates for what are known as central plants, the figures being based largely on the Taft Board estimates. We are not at the present time installing any central power plants, with one exception, and the present policy is to devote all available funds to the installation of reserve plants which are located in the batteries and furnish the current for light and power.

Mr. SHERLEY. You might state to the committee just what you meant by reserve plants.

Col. BURR. The Taft Board's scheme for electric power installations at seacoast defenses included central plants which would furnish the power necessary for all purposes of defense in any group of batteries so located with regard to each other that they could be served economically by one plant. It was contemplated also that these central plants would furnish light for the post buildings as well as for batteries and searchlights; in other words, would be a combined plant, part of the expense to be borne by the appropriations for seacoast defenses and part by appropriations expended by the Quartermaster's Department for post construction. It was deemed necessary, however, by the Taft Board that dependence should not be placed upon this single source of power for light which could not, of course, be located in the batteries. Therefore their general scheme included the location at or in the batteries themselves of small plants to be utilized in case the central source of power was cut off for any reason. These plants are the so-called reserve plants. At that time there was not so satisfactory a type of self-contained generating sets as we have at the present time, and we had been relying for reserve power upon storage batteries and kerosene engines. Since the time of the Taft Board report, however, we have developed a satisfactory type of gasoline engine for this purpose—a type of gasoline motor which practically serves all our purposes. That type of generating sets is now being installed for reserve purposes in all batteries as funds become available, and they are proving so satisfactory that we have about concluded that central plants are not necessary, so that it is not at all unlikely, with further developments on this line, that the item for central plants may not be called for.

There are a few places, however, where it is necessary to install a central plant to meet the combined needs of the service. Corregidor Island is one of the places.

Mr. SHERLEY. Is the situation as to the need of this money any different from what it was last year?

Col. BURR. No; except in this respect, Mr. Chairman: A good many of our existing power plants were hurriedly installed about the period of the Spanish War; they were mostly steam plants, and they are giving out. The funds appropriated last year were partly applied to the replacement of some of these plants that were giving out, and partly applied to the further extending of the installation to batteries having no reserve plants or no other source of power. The amount appropriated is barely sufficient to meet needs of that sort that have come up from month to month. It is desirable also from another point of view to continue this appropriation in a small amount. We have succeeded in developing a satisfactory type of power plant for this purpose, and it is proving successful commercially. However, it never would have been developed if the Government had not pressed for its development to meet its own needs. It is desirable to continue the appropriation in a relatively small amount for these plants, in order that we may continue purchasing on a relatively small scale and continue the development of plants of this sort, thereby preventing our drifting back or standing still. The same remark applies to the next item, which is for searchlights. Searchlights and power plants stood still for many years and with no betterment or improvement in them. In recent years, with the relatively small sums available for these purposes, we have succeeded in securing considerable improvement in searchlights as well as in the power plants. We would like to have some funds under these items to meet what might be called pressing necessities and to continue manufacturing and development.

Mr. SHERLEY. What is your unallotted balance at this time under this item for electric light and power plants?

Col. BURR. The unallotted balance, as stated of November 30, under electrical installation at seacoast fortifications, was \$31,340.05. I know it to be a fact, however, that practically all of the funds that we have available now, either in this power plant item or in the searchlight item, are mortgaged for projects already authorized or practically authorized.

Mr. SHERLEY. What balance have you allotted or unexpended?

Col. BURR. For electrical installations allotted—there seems to be some confusion in these figures which I do not understand, since they show an unexpended balance of only \$22,130. My statement shows, under electrical installations, unexpended, \$22,130.80; available, allotted, \$17,455.28; available, unallotted, \$31,340.05; total available, \$48,795.38, with a note opposite the last figure that this amount is pledged for the procurement of equipment; that is, the amount available at the present time is already pledged.

Mr. SHERLEY. Then it is allotted?

Col. BURR. It is allotted to all intents and purposes.

Gen. BIXBY. The figures are for November 30, and since then it has been pledged.

Col. BURR. The situation is this: The funds are pledged, although they may not actually be allotted. We have committed ourselves to a

piece of work at a certain point, the installation of a plant, we will say, at a certain battery, and the district officer has been called upon for his estimate. We know approximately what it is going to cost, but until we get his detailed estimate we do not know exactly what his estimated cost will be and we do not allot funds to meet the cost of that installation. I can not say that that is the case with this particular item, but that situation frequently happens.

Mr. SHERLEY. If it be true that it be unallotted, are there not sufficient funds, not for the undertaking of new work but for a continuation of work in the sense explained by you, in order that development may continue?

Col. BURR. No; there are not, Mr. Chairman, and for this reason: We have made our plans on the basis of utilizing the money in hand, and practically will use it during the current fiscal year. We are committed, practically, to the expenditure of all this appropriation, and unless there is some delay in carrying some of the work to completion it is probable that at the end of the fiscal year we will have nothing unallotted and but comparatively little unexpended.

Mr. SHERLEY. How much of this money is expended for machinery of the type that you desire to continue to have supplied by private manufacturers?

Col. BURR. Ordinarily the cost for the complete installation of one of these reserve sets, with a capacity of 25 kilowatts, is from \$5,000 to \$6,000 or \$6,500. Where installed in a battery now completed the cost, as a rule, does not run much more than \$5,000. Of that \$5,000 the cost of the machinery is ordinarily estimated at \$3,500. It will vary slightly, depending upon the switchboard needs and other things, \$3,200, \$3,300, or \$3,500. The balance is the cost of installation; that is, the cost of preparing the space to receive it and the actual erection of the machinery and the necessary electrical connections. In some batteries, where the work is rather simple, we are able to install for as little as a thousand dollars.

Mr. SHERLEY. In the event that no appropriation was made for this item, what actual harm would come along the line that you have indicated? You have indicated the desirability of continuing small appropriations under this item on account of commercial reasons, as I understood you; now, at the end of the year, what would happen?

Col. BURR. We would not be able to meet some of the needs of the service.

Mr. SHERLEY. Of course, that I understand. But I am speaking of the other proposition.

Col. BURR. So far as commercial conditions are concerned it would not do any harm; but in view of the fact that we will be sailing very close to the wind as to available balances at the end of the year we should have something to meet emergency conditions that may arise.

Mr. SHERLEY. That is not a repair item at all? *

Col. BURR. No.

Mr. SHERLEY. It is not a maintenance item at all?

Col. BURR. It is a maintenance item to the extent that it is a replacement item; that is, we can use this appropriation to purchase machinery and replace worn-out or obsolete machinery.

Mr. SHERLEY. But it is not ordinary maintenance of a plant that has been installed?

Col. BURR. No. We should have a small amount—made as small as the committee feels it must be made—rather than to have nothing at all. For instance, it would be better to give us \$10,000 than to cut us out entirely, if the committee does not feel justified in giving \$50,000.

Gen. BIXBY. I should like to add to Col. Burr's statement that we thought we ought to have \$100,000 in order to keep the work going along and put things in proper shape; we originally estimated \$100,000 and that was cut to this \$50,000; and cutting it down to \$50,000 we think is getting it down to bedrock.

PURCHASE AND INSTALLATION OF SEARCHLIGHTS.

Mr. SHERLEY. The next item is "For purchase and installation of searchlights for the defense of our most important harbors." For that there is an estimate of \$102,000?

Col. BURR. With the amount of this estimate it is contemplated to continue the purchase and installation of searchlights at the more important harbors on the Atlantic coast. The installation has been quite well provided for on the Pacific coast and is in progress of advancement on the Atlantic coast. With this amount it was expected that searchlights would be procured and installed for Boston Harbor and New York Harbor, thereby advancing the projects at those two places. It would not complete the work at either one, but it will go a part way toward completion and, as stated with regard to the power-plant installations, will permit of doing some little work, keeping in touch with the work and keeping it going, slowly continuing the development of appliances and preventing the work from standing still, which practically means going back. So we would like very much to have a small appropriation. Of course, like any other construction work, it can be omitted; we can not say that one year's suspension of operations along that line would make any large or material difference. But the estimate for the complete installation is large and considerable, and at this rate it would be only finished in a number of years. But we particularly want some money to make some progress, to continue the development of appliances, and to meet emergencies as they come up.

Each year there are a few instances where it is necessary to make some change in present installations, to substitute one light for another and do some things which are often necessary for the efficiency of what we at present have. And if it is necessary to reduce amounts we would rather see only partial reductions on these items. The amounts have been cut quite severely before reaching Congress, and, as a matter of fact, I think it is safe to say that if something must be cut we would rather see the modernizing cut than to see the items for searchlights and power plants entirely eliminated.

Mr. SHERLEY. The estimate is just twice the estimate of last year. At that time it was \$50,000, and the appropriation was \$50,000.

Col. BURR. Our original estimates this year were considerably greater than when they reached Congress. They have been severely pruned in the department by direction of the President, and the amount left in is only such as the department could leave in while reducing the total of the bill to meet certain requirements.

Mr. SHERLEY. The standard sizes, as I understand it, are 60-inch searchlights and 36-inch searchlights.

Col. BURR. The standard size at the present time is the 60-inch light. We are not purchasing any 36-inch lights, and I do not know that we would in the future purchase any 36-inch lights except for inside waters where the range, so to speak, is small.

Mr. SHERLEY. The hearings show that last year the total installations cost complete, including overhead charges, purchase price, cable, and everything else, \$17,000 for the larger lights and \$9,000 for the smaller lights. Has there been any change in their cost?

Col. BURR. No change. Those figures are the average costs, as we find them, from point to point. In some instances the purchase and installation of a light will run above those figures, and in others below; but taking the country as a whole we find now, as they found at the time these estimates were made, that the average cost per searchlight is as stated.

Mr. SHERLEY. This item differs in this particular from the other, does it not, that there is no need for any working balance in the sense of taking care of any emergencies that may happen in connection with them, like might happen in regard to light and power plants?

Col. BURR. It does not greatly differ. We have some lights on hand not completely installed, and there are some forts in which the searchlight installation is quite incomplete. Also in connection with ordinary Coast Artillery practice there come up from time to time requests for the installation or the betterment of searchlights in order that they may carry on their night drills. In meeting requests of that sort and in applying the funds we have on hand we add to the efficiency of the service, and particularly so far as current work goes to the efficiency of artillery practice.

Mr. SHERLEY. The estimate, however, is based on the idea of purchase and installation; \$102,000 was asked for that primarily, and not with the idea of any emergency that might happen.

Col. BURR. Of course, this statement that the amount estimated, \$102,000, would be applied to the purchase and installation of lights at Boston and New York is as near as we can state at this time. The actual application of these funds—which become available on the passage of the act, and are to cover expenses for the period up to a year from the 30th of next June, some 18 months—because of emergencies and other matters arising from time to time, varies slightly, but the appropriation is all being applied to original installations, and in some cases it is applied to installation of lights which are now on hand.

Mr. SHERLEY. You have on hand an unallotted balance of how much?

Col. BURR. My notes show an unallotted balance of \$11,390.08.

Mr. SHERLEY. As of what date?

Col. BURR. Of November 30.

Mr. SHERLEY. How much available of unexpended balance?

Col. BURR. \$74,548.83. Now, as a matter of fact, the entire \$50,000 appropriated by the last act has been applied to the purchase of searchlights. Orders have been placed for as many lights as can be purchased with that appropriation. Whatever other balances there

are on hand are small balances remaining from some previous appropriation, some of them savings from other allowances, but the greater part of that is allotted or is mortgaged at this time. In obtaining searchlight appliances the greatest delay results from securing the lights, the projectors themselves. The essential elements of these lights are, first, the light itself, and, second, the projectors which concentrate the light. They have to come from abroad and are slow to get; that is, the mirrors or projectors.

Mr. SHERLEY. You are still buying abroad?

Col. BURR. We have to get the mirrors abroad; we can not secure a satisfactory searchlight mirror in this country. So that all the funds appropriated by the last bill was allotted to the purchase of searchlights.

Mr. SHERLEY. Without leaving money for installation?

Col. BURR. Without leaving funds for installation and without even including the purchase of the necessary power plants to operate them. The power plants can be secured on very short notice and the installation can be done, if necessary, in a very short time, and since the main delay was in securing the lights, the projectors themselves, it was considered wise by the department to apply these funds to the purchase of such parts as required some time to secure; that is, the projectors themselves.

Mr. SHERLEY. What power is used in the operation of a searchlight?

Col. BURR. The standard installation at the present time includes one of the 25 kilowatt gasoline generating sets which were mentioned in connection with the power-plant installation. One of those sets forms part of the equipment for a 60-inch light, and the installation includes the placing, erection, and sheltering of the lights and power sets.

Mr. SHERLEY. The power, I presume, is in the form of electricity?

Col. BURR. Yes, sir.

Mr. SHERLEY. And you get that power from the same plant that you use for the electric light and power, the item above?

Col. BURR. Not from the same plants; but we use the same type of machinery.

Mr. SHERLEY. Why not the same plant?

Col. BURR. As a rule the searchlights are installed at such a distance from the batteries that we can not efficiently and economically utilize the battery plants for this purpose: Where it is possible to use a battery plant we do so by installing in the battery such number of these 25-kilowatt units as may be necessary to furnish current for the battery and for the lights as well.

Mr. SHERLEY. You say the searchlights are some distance from the batteries?

Col. BURR. The searchlight is a part of the night operating system. It is essential to night operations. You must pick up a target or a ship with a light—that is, outline it and illuminate it to such an extent that the range-finding instruments can follow it accurately. Therefore the range-finding instruments—that is, the fire-control stations and the searchlights—must be coordinated in their location in regard to each other. Now, the searchlights, as a rule, must be located on the outside of all the range-finding instruments, because

the beam of the searchlight itself is a mask for anything behind it. You can not see through it. Therefore, as a rule, searchlights are placed away from the battery and on other sites that, in some instances, removes them to a considerable distance from the battery.

Mr. SHERLEY. The impression I got from the hearings last year was that they immediately adjoined the batteries, and that, while they were movable, in the sense that they were on a little truck, they were no distance away from the batteries themselves.

Col. BURR. That is sometimes the case. I did not mean to state that in all cases they are remote from the batteries. In some instances, in fact, in a number of cases, where sites are contracted, they are placed quite close to the battery. At some places they have to place them directly adjacent to the battery and sometimes in front of the battery by reason of not having another or more suitable location. Of course, where it is possible to use the same plant of the batteries for furnishing current for the searchlights the plant is so used. Now, in regard to their portability, which was discussed in the hearings last year, and with regard to which I made some statements at the time, it would seem necessary to add perhaps something in explanation. These searchlights are not what would be termed portable in the ordinary sense of the term. I refer to the 60-inch searchlights which we are now installing. They are large and not easy to move, and the plant necessary to furnish the current has a certain bulk and weight, and, with its accessories, is also not easy to move. We have some portable searchlights of the 36-inch size, but the 60-inch light can be considered portable only in this sense, that, like anything else of even much greater weight, you can put it on a car and move it on a track a certain distance; and that is what is done in some instances. The policy followed with regard to their installation is to place them where they will, as far as possible, be concealed during the day, and during the day may be protected from the enemy's fire. That necessitates withdrawing them during the day from the position in which they are operated at night. To accomplish that purpose we, in some instances, put them on a car running on a track and haul them back out of sight and under shelter, and only in that sense are they portable.

Mr. SHERLEY. I do not gather just why it is necessary, except to protect them in the daytime from the enemy's fire, to have them any distance away from the batteries.

Col. BURR. It is merely a question of finding the location from which the waters, over which an approach at night may be expected, can best be illuminated for the use of fire-control stations and gunners at the batteries.

Mr. SHERLEY. In no case are they more than about 100 yards from the batteries?

Col. BURR. Oh, yes; in some cases quite a considerable distance farther than that.

Mr. SHERLEY. Do you find it cheaper to install separate power plants than to transmit power from the other power plants?

Col. BURR. Yes, sir. The question of transmitting power from the nearest battery installation and that of installing a separate plant is one entirely of economy. It is entirely a question as to whether

the power can be furnished to the light cheaper from one source than from the other as a matter of first cost. Where it is necessary to furnish a power from a separate plant, which is the standard installation, as we recognize it, the power plant is installed as near to the operating position of the light as is convenient, consideration being given to protection from the enemy's fire.

Mr. SHERLEY. Did you state what the unallotted and unexpended balances were?

Col. BURR. I do not remember whether I stated them just now or not, but I can state them. Under searchlights for harbor defenses the unexpended balance on November 13, 1911, was \$74,548.83; there is available, allotted, \$21,762.14; available, unallotted, \$11,390.08, making a total available of \$33,152.22. Of those amounts the only sum available, as of date November 30, for work not already taken in hand, is \$11,390.08, and some of that has practically been mortgaged.

Mr. SHERLEY. What is the cost of the installation of a light, exclusive of the cost of the light itself? Of course, it varies, but the average cost.

Col. BURR. The main elements of cost are about as follows, and I will correct these figures in my notes: For the purchase of the searchlight itself, with its accessories, that is, its immediate accessories, including controller and controller cable, about \$5,000 for a 60-inch light; for power plant, the same as I stated this morning for reserve plants, from \$3,300 to \$3,500, making a total of \$8,500; the remainder of the cost for a 60-inch light, amounting to \$8,500, is applied to the installation of the light itself and of the power plant. The erection of suitable shelters for the light and power plant is part of the cost of that installation, as is also the purchase of cables, so far as may be necessary, for connecting the power plant with the searchlight. A portion of this cable expense is independent of the relative location of the power plant and the searchlight with regard to each other. The controller cable, for instance, must be sufficiently long to extend from the light to the point from which the light is operated. The lights are electrically operated and controlled from a distance, and the point of operation is usually in one of the stations of the fire-control system, so that the officer in charge directs his light from the station from which he also directs his gunfire.

Mr. SHERLEY. Have you stated the total amount required to supply all the requests made for searchlights?

Col. BURR. \$2,200,000. That is practically the balance of the Taft Board estimates, taking credit for appropriations made and searchlights provided from appropriations made since the Taft Board's report was submitted, and taking a certain amount of credit also for searchlights purchased and in part installed prior to the submission of the Taft Board report. I should say in this connection, with regard to those figures, that they, like some other estimates, are subject to minor revision to meet conditions as they exist.

Mr. SHERLEY. I have not a memorandum here showing the total amount appropriated, but we paid for searchlights \$1,655,000; is that in accord with your understanding?

Col. BURR. Yes.

PROCUREMENT OR RECLAMATION OF LAND, CAPE HENRY, VA.

(See also p. 157.)

Mr. SHERLEY. The next item is:

For the procurement or reclamation of land, or right pertaining thereto, needed for site, location, construction, or prosecution of works for fortifications and coast defenses.

The estimate calls for \$150,000, with a footnote as follows:

It is contemplated to apply the amount of this estimate, if appropriated, to the purchase of land at Cape Henry to accommodate fortifications for the defense of the entrance to Chesapeake Bay.

Col. BURR. That item was submitted by direction of the Secretary of War in the Engineer Department's estimate, since that department is charged with the procurement of sites for fortifications.

Mr. SHERLEY. You have nothing to say as to the necessity for the purchase of this land?

Col. BURR. Nothing, except that the department considers the entrance to the Chesapeake the most important point at which to undertake new defenses at the present time, and in that opinion I think all the bureaus concerned are agreed.

Mr. SHERLEY. About how much land will it be necessary to acquire in order to erect suitable fortifications?

Col. BURR. This item of \$150,000 is based on the purchase of about 300 acres.

Mr. SHERLEY. That would be at the rate of \$500 an acre?

Col. BURR. Yes. It is on a seabeach, which is more or less of a summer resort and occupied for summer-resort purposes.

Mr. SHERLEY. What need is there for that much land, unless you propose putting a permanent garrison there?

Col. BURR. I can not say; but the batteries themselves must be extended at some distance along the sea frontage in order to maintain proper spaces between them. The policy of the department, and I think it a wise one, now is to secure in the initial purchase, so far as can be foreseen, sufficient land for all purposes connected with defenses rather than to purchase the minimum necessary for defenses, and other purposes, and then be pushed to the necessity later to acquiring more land, always at increased values.

Mr. SHERLEY. This is on the assumption, then, that there will be some need of land for purposes other than just the batteries themselves, because they, of course, would not take anything like 300 acres?

Col. BURR. There will be land needed for other purposes.

Mr. SHERLEY. For what?

Col. BURR. For quarters of troops, if it is merely tentage space alone.

Mr. SHERLEY. You would not purchase land to be used in placing troops in tents in time of war?

Col. BURR. No; under war conditions they would occupy the land. But just what the layout of this present scheme of defense is and how much of these 300 acres will be used in connection with the defenses, which include not only the batteries, but fire control and searchlights, I can not say.

Mr. SHERLEY. How much is usually occupied by defenses for just those purposes enumerated, exclusive of officers' quarters, garrison, etc.?

Col. BURR. I am trying to think of the area in a concrete case in which I have the figures in my memory. One of the last pieces of land purchased for the purposes of defense was Deer Island, Boston Harbor, and my impression is we secured 70 acres. We secured, I think, 70 acres of upland; that is, above high tide. The amount extending to low tide was considerably greater [100 acres]. That did not include any space that was particularly available for the erection of a post or for any other similar facilities. Of course, there is some land in between the batteries that could be used for minor purposes, but not for the erection of a post.

Mr. RAUCH. How do you arrive at the estimate that this land will cost \$500 an acre?

Col. BURR. I can not say how the War Department arrived at that estimate. The figures were transmitted to us to include in the estimates. I can only say this, that the district officer at Norfolk, who handles that portion of the work for us, does not consider the estimate excessive, and he bases his opinion on a study of land values.

PROTECTION, PRESERVATION, AND REPAIR OF FORTIFICATIONS.

Mr. SHERLEY. The next item is:

For the protection, preservation, and repair of fortifications for which there may be no special appropriation available.

You are asking this year, as you have for a good many years, \$300,000. You were allowed the last two years \$300,000 and the two years prior to that \$225,000. What is the condition of your balances now, unallotted and unexpended?

Col. BURR. As of date November 30, 1911, the balances under the appropriations for protection, preservation, and repair of fortifications were as follows: Unexpended, \$229,461.61; available, but allotted, \$203,380.19; available, unallotted, \$53,738.92; total available, \$257,119.11.

Mr. SHERLEY. That makes unexpended, then, an amount something like \$470,000?

Col. BURR. No; the total available is \$257,119.11.

Mr. SHERLEY. I understand; but the first item you gave was \$229,000 as unexpended. Now, is that meant to be exclusive of the other two?

Col. BURR. Yes; in this sense: That amount is the amount shown by the reports of our district officers as unexpended balances of the date given above. It includes balances unexpended of amounts which have been allotted to them for the performance of certain work and is reduced by outstanding liabilities to \$203,380.19. This last sum, increased by the \$53,738.92, which has not been allotted and remains under the control of the department for distribution, compose the total of funds available and unexpended, amounting to \$257,119.11 for this appropriation item.

Mr. SHERLEY. Let me see if I understand you. The \$229,000 has not been expended, but has been allotted among the district officers; is that true?

Col. BURR. Yes; these are really two sets of figures. That is, their unexpended cash balances of funds under that appropriation of that date regardless of the figures which follow. In other words, the cashbooks of the department in regard to this matter show that of that date there was in their hands unexpended that amount of funds which had been allotted to them. Part of these funds still remain in the Treasury and part is in their accounts at the sub-treasuries or banks. But that is the actual balance of allotments shown on hand unexpended of that date. Now, there then follow two other sets of figures, viz, available, allotted, \$203,380.19, which is the amount that has been allotted and is still available for expenditure as shown by the officers' cash accounts; the next, \$53,738.92, is the amount unallotted and still in the Treasury and not at the disposition of any of our district officers.

Mr. SHERLEY. How is it that those two items do not bear the same relation of agreement with the first item?

Col. BURR. The difference is this: The \$229,000 is the actual cash on hand unexpended of funds allotted.

Mr. SHERLEY. That includes money that you have to your credit in the Treasury, does it not?

Col. BURR. And would be, as I take it, the amount on hand encumbered by liabilities. If that is not right, I will correct it in my statement. In making up these statements of funds available there are several items that enter: First, the actual cash balance on hand to the credit of the appropriation in the officers' disbursing account or in the Treasury; second, outstanding liabilities, money actually expended, but not disbursed. When a liability is created the money may not be disbursed until some time later. For instance, when a contract is made a liability is created and to that extent reduces the amount available, so that if these figures, which I did not make up, are made up according to the customary practice, the first figure in all cases should be the unexpended amount on hand to the district officers' credit and is to be reduced by outstanding liabilities. That is, the outstanding liabilities are still to be deducted.

Mr. SHERLEY. What I am trying to arrive at—and I may not grasp what you say—is what relationship the first item of \$229,000, which I understand is a cash item, bears to the two subsequent items of \$203,000 of allotted but unexpended balance and \$53,000 of unallotted balance?

Col. BURR. That is the only explanation that I see. The bookkeepers, you know, have made up these figures, Mr. Chairman, and that is the only explanation I can give at this time. Assuming that the figures are correct, which no doubt they are, the explanation rests with the fact that the first figure is the sum allotted and unexpended, and the second is the sum available after the deduction of outstanding liabilities.

Mr. SHERLEY. \$53,000 is unallotted; that is available, then?

Col. BURR. That is available at this time for allotment to meet work for which no funds have yet been allotted and which may be necessary to be done.

Mr. SHERLEY. What estimates have you which you think, within the fiscal year or prior to the 1st of May, would use up any part of that \$53,000?

Col. BURR. The appropriation under this item is the general administrative and maintenance appropriation for all of the seacoast defenses in this country. It covers the expenses not only of the maintenance and repair of the physical elements of the defenses themselves, but it must cover also the administrative overhead cost of caring for the defenses. So that as there are no other funds available to our district officers in charge of the defenses in this country for administrative purpose in connection with these fortifications they must meet all administrative costs from such allotments as are made to them from this appropriation, in addition to doing such work as may be necessary, and that it is possible to accomplish with the allotment that is made to them. For instance, there is no appropriation, other than this, that is available for the office expenses of our officers charged with this work; therefore a certain part of this goes to meet office expenses, as well as to make actual repairs to batteries themselves.

Mr. SHERLEY. What proportion does go toward office expenses and what proportion to meet that called by you overhead charges?

Col. BURR. I can not give the figures; I can get them for you if you desire, but it is a relatively small cost. As a rule, the officer who is charged with the fortification of a harbor is also charged with river and harbor improvements in that same vicinity. The expenses of such an office are prorated among all the duties assigned to it, so that fortifications bear only their share of such expenses.

Mr. SHERLEY. Are there any salaries?

Col. BURR. Such expenses are, as a rule, prorated on the basis of expenditures, and expenditures for fortifications are relatively small; not nearly as large as they are for river and harbor work. The proportionate share that fortifications bear of the overhead expenses of district officers is relatively small, but the fortification service does bear the expense of such special employees as are necessary to the accomplishment of its work. If it is necessary, as it usually is, to have a draftsman in a fortification office, his expenses are borne from this appropriation for preservation and repair of fortifications, except as he may be employed upon work for which a special appropriation is made.

Mr. SHERLEY. Well, if without too much trouble you can put in the hearing the percentage of these sums that are expended in overhead charges, I wish you would do that when you come to correct your notes.

Col. BURR. Very well. But this balance of \$53,738.92 is all that remains unallotted to meet any contingencies which may arise between now and the end of the fiscal year.

Mr. SHERLEY. Do you know at this date of any demands on that \$53,000 that will have to be met?

Col. BURR. I can only answer that in this way: We have on our books items of repair and maintenance that are much in excess not only of that amount but of next year's appropriation. I have a summary of them here, amounting to four hundred and sixty-two thousand and some-odd dollars, for which no allotments have been made. In other words, there is always a large amount of uncompleted work in connection with the preservation and repair of fortifications which has not been taken up or attended to because funds

have not been sufficient for the purpose. For that reason we do not allot at once—that is, at the beginning of the fiscal year—all of this appropriation; we reserve a certain amount to meet emergencies which might come up later, and if those emergencies do not arise then when the end of the year approaches and other funds become available or are in sight we then apply the money to the work which is reported to us by the district officer as deemed to be most urgent.

Mr. SHERLEY. Do you mean that the four hundred and odd thousand dollars of estimated expenditure in the way of maintenance and repair is proved or simply submitted by district officers?

Col. BURR. That amount has been submitted by the district officers and is practically proved to this extent, that repairs to that amount have been called for. Among the items I have here are those for general maintenance and repair, which are numerous and varied in character; they amount to \$330,000, and they change from month to month. Some others are: Ventilators, \$23,000; grated doors, \$48,000; damp proofing, \$60,000.

Mr. SHERLEY. What is meant by that?

Col. BURR. These modern batteries are built largely of concrete and covered with more or less of earth, particularly in front of them. Such construction renders the interior spaces somewhat like underground cellars and caves. In the older designs, which were very economical in their make-up, the interior spaces were not finished, they were left bare. That condition, while it results from an economical design, also results, in northern latitudes especially, in a certain amount of dampness. This dampness is objectionable from many points of view, and we are meeting it and correcting it in the later type of battery built in recent years. It has not been possible to correct it fully in the older types of batteries, but so far as possible we are meeting it and correcting it by methods of damp proofing, as it is called; by improving and repairing these batteries to such an extent and in such a way as will prevent dampness and prevent condensation and leakage where it exists. For the same reason we are doing the work covered in the next preceding two items—that is, by placing ventilators and grated doors in the batteries. The better method is by improving the ventilation; and these ventilators, grated doors, and damp proofing are all for the purpose of making the batteries drier.

Mr. SHERLEY. What are the other items?

Col. BURR. That covers the four main items, of which the first—general maintenance and repair—is the largest; that item includes miscellaneous items of all sorts for the maintenance, repair, and minor improvements to these batteries. Under the item for the protection, preservation, and repair of fortifications we cover and provide for all the minor betterments—betterments which are not of sufficient magnitude to be considered as modernizing the battery.

Mr. SHERLEY. What check is had by your office on the estimates that are sent in by the district officers?

Col. BURR. We exercise only a general check in this way: That we compare their estimates with those of other districts on the basis of percentage of money required, and we also make a comparison as to the original cost of the batteries. We know also that many of these items have been the subject of inspection reports, and that the district officers in giving estimates for such items are

meeting the criticisms so made. So far as concerns the actual amount of the estimates required to do a certain piece of work, we must, in general, depend upon the district officers for their accuracy. It is impracticable to sit at a desk in Washington and make an accurate estimate of the cost of a piece of work done at a distance.

Mr. SHERLEY. What about the desirability of doing the work?

Col. BURR. That we consider very carefully and very closely, and, as a rule, we have only sufficient funds to meet the most urgent and special items of repair. The distribution of this fund is practically made on this basis, that to each district is allotted a certain amount for purposes of general maintenance, which includes the making of such small repairs as become necessary from time to time. For instance, every time the guns in a heavy battery are fired there is liability to some minor damage, if it is only the breakage of glass, and an allotment for such general repairs of a minor character is made to each district. Then, the balance of the fund allotted to the district is made to cover special items of repairs or minor betterments which the officer specially reports upon and shows to the department to be necessary.

Mr. SHERLEY. What is the total value of the property that is preserved and repaired by funds under this item?

Col. BURR. This item is applied to the maintenance and repair of batteries and their accessories, including fire-control installations so far as the Engineer Department is concerned; that is, it applies not only to the maintenance and repairs of batteries, but it applies to the maintenance and repair of fire-control stations. Our compilation of cost shows that the first cost of the completed works to which this appropriation is applied is \$31,397,838.98; so that the amount that we are now receiving each year, Mr. Chairman, for the maintenance of these works, scattered throughout the length of our coast from Maine to Florida and Galveston and on the Pacific coast, where they are exposed to the elements and exposed to damages due to gun fire, is only 1 per cent of their first cost.

Mr. SHERLEY. Of course, a great deal of the first cost necessarily goes into work on which there is practically no upkeep?

Col. BURR. There is some upkeep with regard to practically all of it. Of course, first-class concrete, comparatively new, requires very little repair in one sense; but it is found in these days not only desirable but necessary to paint the surface of this concrete, and that requires the expenditure of money from year to year out of this appropriation. There are certain appliances in the battery, like projectile hoists, on which we must figure an annual upkeep of much more than 1 per cent, being machinery; and so it goes all through. There are many things necessary to be done; there are certain interior spaces which have doors and hinges which must be repaired, and there are windows in which the glass is broken. As I said a moment ago, this includes not only the cost of the repairs made but the administration of the service.

Mr. SHERLEY. I notice that last year you were asked to state, if you could, what proportion of the \$21,000,000 you then stated as the value of the property (and which you said you were inclined to think ought to be \$30,000,000, and which you now state at \$31,000,000) was represented by concrete work, and you said you did not think it was possible to answer that, but you would insert the figures. I

notice the figures were not inserted. Have you any information now as to what proportion of that \$31,000,000 is represented in concrete work?

Col. BURR. I have not. And since this work dates back, some of it over a period of 20 years, and since it is probable that the cost accounts kept of the work at that time did not separate concrete costs from other costs, I doubt whether it would be practicable to procure it.

Mr. SHERLEY. Have you any idea whether it is half, or whether it is very much more than half?

Col. BURR. The estimates submitted to cover the cost of a recent 12-inch battery in the United States included the following items, viz: Excavation, foundation, and fill, 8.3 per cent; concrete, 66 per cent; waterproofing, 2.1 per cent; drainage, water supply, and fixtures, 2.1 per cent; steel in concrete, 9.5 per cent; steel fixtures, 3.7 per cent; hoists, 2 per cent; other metal appliances, 1.8 per cent; electric-light wiring and fixtures, 3.7 per cent; roadway, 0.4 per cent.

With regard to the \$21,000,000, as stated last year, I might add that the figures were then summarized for the first time. The summary had just been completed and we had not had time to revise it before the hearings last year, and feeling satisfied that there were inaccuracies in it we merely used the figures for what they were worth. Since then the figures have been revised and made as accurate as possible.

Mr. GOOD. This item does not cover repairs or replacements of machinery other than the hoists for projectiles?

Col. BURR. No. The replacement of power plants and batteries is carried by a separate item, and the supplies necessary for the operation of power plants, searchlights, and other accessories are carried by still another item.

Mr. GOOD. Do I understand you to say that the repairs and replacements of fire-control stations are covered by this item?

Col. BURR. Yes; repairs are covered by this item. All repairs of fortifications that are made by the Engineer Department, including the repair of fire-control structures, are provided for in this item.

Mr. GOOD. What do you mean by that?

Col. BURR. I mean such structures and other elements as are built by the Engineer Department are repaired and maintained by the Engineer Department out of this item; I mean to differentiate between the Engineer Department and the Signal Corps; they have a special appropriation for maintaining the Signal Corps portion of the fire installation, but in the absence of any other appropriation for the maintenance and repair of fire-control structures, we utilize this item, which reads:

For the protection, preservation, and repair of fortifications for which there may be no special appropriation available—

since we consider that the fire-control stations are a part of the fortifications.

PREPARATION OF PLANS FOR FORTIFICATIONS.

The CHAIRMAN. The next item is "For preparation of plans for fortifications." Since the inception of this item the estimate has been \$5,000 and the appropriation \$5,000. I notice in the state-

ment I have here that at the time it was submitted you had an unallotted balance of \$5,596.54. What is your unallotted balance now?

Col. BURR. There is no unallotted balance, Mr. Chairman, although I do not find the figures here; I have them somewhere, but I know there is no unallotted balance, and for this reason: This item for a number of years has been utilized to cover such expenses of the Board of Engineers in New York as relate to fortifications and for the preparation of plans for fortifications. The Board of Engineers in New York has also other functions; it handles some other matters and the same three officers occupy the same office space and constitute other boards for river and harbor purposes, as for instance, the harbor line board, of New York; so that the expenses of the board are met in part from this item and in part from river and harbor appropriations.

Mr. SHERLEY. Is the amount of \$5,000 always charged to this item?

Col. BURR. The amount charged to this item is the amount that must be paid for the expenses of the board, consisting largely in salaries of employees; I will give you, if you like, in detail, the estimate of the board for the expenditure of these estimates, which will show that a large proportion goes into salaries of draftsmen used purely and simply for fortification work.

Mr. SHERLEY. This statement, submitted to me a month ago, shows a balance of some \$5,000.

Col. BURR. You have the balance as of June 30, Mr. Chairman, I think, and, of course, this appropriation for this fiscal year only became effective the following day and runs for 12 months later. [Note: The balance available Nov. 30, 1911, was \$4,400.60.]

Mr. SHERLEY. It may have been made at that time, though it was submitted to me just a month ago. We will pass on to the next item.

Col. BURR. I might add in that connection, Mr. Chairman, that a larger sum is contributed by the river and harbor appropriations and other funds for the purposes of the engineer board at New York than is contributed by this appropriation.

Mr. SHERLEY. And a larger amount of work is done, too, is there not?

Col. BURR. Yes; I should say so. But fortification work involves, dollar for dollar, a much larger expenditure for office and clerical services than river and harbor work.

Mr. SHERLEY. Have you not pretty well finished your plans for fortifications?

Col. BURR. They are never finished, Mr. Chairman; the minute we stop work on plans for fortifications, just that minute we stand still and the world goes on ahead of us. We are developing and improving our fortification plans continuously and the work never stops.

TOOLS, ELECTRICAL AND ENGINE SUPPLIES, ETC.

Mr. SHERLEY. Pass to the next item—

For tools, electrical and engine supplies, and appliances, to be furnished by the Engineer Department, for the use of the troops for maintaining and operating electric-light and power plants in gun and mortar batteries.

You ask for \$45,000. What is the financial statement as to that item and what balances have you?

Col. BURR. Under the item just mentioned, which is known for short as the appropriation for supplies for seacoast defenses, the figures, as of date November 30, are as follows: Unexpended, \$57,458.70; available, allotted, \$43,467.41; available, unallotted, \$5,596.54; total available, \$49,063.95.

Mr. SHERLEY. What demands on the unallotted balance do you anticipate during this fiscal year?

Col. BURR. Nothing above the ordinary requirements. These funds, like all other maintenance funds, are administered by the district officers to whom they are allotted for expenditure with a view to meeting the necessities and any contingencies or emergencies that may arise during the year. Naturally, under those conditions, the officer, practically knowing that he can get no more funds except those allotted to him, conserves and reduces his expenditures during the early part of the year as much as possible, so that if any contingencies arise he may be able to meet them, and then in the latter months of the year he applies his balance to needs as they then exist and when it is safe to do so. For instance, and to illustrate that, in making allotments under this item of preservation and repair last July, we observed that a certain officer had on his books carried over from the previous year a balance which we thought should be taken into account in making his allotment for the next year. We corresponded with him and found that he had, in order that he might not be caught without sufficient funds, reserved the expenditures until it was safe to spend the money, but he had proposed to make the expenditures by the time we took up the matter with him; and I think that is safe administration. So that the balances of maintenance funds, as of date of November 30, are not a safe guide as to the balance that will remain at the end of the year.

Mr. SHERLEY. Do you think you will need the total sum estimated—\$45,000?

Col. BURR. We think we will. We have some suggestions here which later should reach the committee.

Mr. SHERLEY. I would be very glad to take them up as they refer to the particular items in the bill.

Col. BURR. These suggestions with regard to wording are made in one instance to meet administrative necessities that have arisen and in another instance to meet the views of the committee with regard to the separation of items of maintenance from items of first cost of installation. There is no increase of estimate involved in them, and, what is more, there is no increase in cost of the ultimate cost of the structures involved, in this suggested wording.

Mr. SHERLEY. What wording is it you desire changed?

Col. BURR. In this item which we were just discussing—

For tools, electrical and engine supplies, and appliances, to be furnished by the Engineer Department, for the use of the troops for maintaining and operating electric-light and power plants in gun and mortar batteries—

it will be observed that the same items, which are practically intended to serve the same purpose, one for continental United States and the other for the insular possessions, do not agree in wording as they now stand. Moreover, they contain no authority for the expenditure of these funds for operating searchlights. Searchlights must be operated, and there are certain expenses involved.

Mr. SHERLEY. Where have you gotten the money heretofore?

Col. BURR. As a rule, it has been taken from this same item. I think, to a certain extent, repairs, until the present year, when the wording was changed, were taken from the appropriation for searchlights, but we desire to meet the committee's views fully in that respect and to separate maintenance items from first-cost items, and for that purpose to definitely include, without increasing the cost of the work or the amount of the estimates, searchlights in this item, so there will not be any question but what we are authorized to use this same fund for searchlights. As a matter of fact, searchlights are operated by the same type of gasoline sets that power plants are, and they use the same supplies and are run by the same personnel. When they submit a requisition for oil or other supplies for any of the purposes, we do not know whether they use the supplies for an engine on searchlights or power plants. In fact, it is immaterial, so far as the Government's interests are concerned, and therefore we suggest that the item which I read above be amended by including searchlights and by changing the last few words in the item to read, "at seacoast fortifications," instead of "in gun and mortar batteries." The latter suggestion is merely due to the fact that some of these engines are not installed in gun and mortar batteries. Some of them are in separate structures. It is further recommended that the item read the same—

Mr. SHERLEY (interposing). For the insular possessions?

Col. BURR. Yes; there is no reason why one should be different from the other.

Mr. SHERLEY. The committee will be glad to consider the suggestions.

RESERVE LIGHTS.

Now, the next item is, "For reserve lights." For that there is no estimate this year.

Col. BURR. No; it was cut out in the War Department. We will try to meet it from the regular appropriation if we can; we may be able to make some little headway on it. And this is where the question of existing balances sometimes comes in at the end of the year. If at the end of the year we have small balances which we can use to advance that particular piece of work, we will apply them to it.

CONSTRUCTION OF SEA WALLS AND EMBANKMENTS.

Mr. SHERLEY. The next item is, "For construction of sea walls and embankments." The estimate is for \$25,000. What balances have you there?

Col. BURR. The balances as of November 30, 1911, unexpended, \$1,853.53; available, allotted, \$1,573.86; available, unallotted, \$7,026.51; total available, \$8,600.37.

Mr. SHERLEY. Is there anything to indicate that any demands will be made on that unallotted balance during the remainder of the year?

Col. BURR. We have on our books for attention, more or less urgent, something like a million and a half dollars' worth of work, and with only small sums available we endeavor, and must endeavor very carefully, to avoid any expenditure from this appropriation,

excepting for repairs that are urgent. As a matter of fact, we have this small balance, and we are holding on to it pretty tightly until we get additional funds, so that in case of any emergency we will have some funds applicable to repairs of sea walls, as those repairs sometimes are urgent.

Mr. SHERLEY. Now, I notice here that the item reads, "For construction of sea walls and embankments," whereas the note says, "This amount is estimated as necessary for the maintenance and repair of existing sea walls." The item would indicate it was original construction, and the note would indicate it was maintenance and repair.

Col. BURR. The item has general application and, so far as I know, has remained unchanged for a number of years. The wording is such as to provide for original construction where original construction is necessary. I had a case in Boston Harbor, where I was on duty before coming to Washington, and where original work was necessary in order to save the reservation. It was being eroded by the sea to such an extent that the batteries were in immediate danger; there had been no sea wall there before, and original construction was necessary. Cases of that kind arise from time to time, but we have not in prospect at the present time the expenditure of the amount of this estimate in original construction.

Mr. SHERLEY. How do you get authority to repair it? I can understand how the language permits original construction, but it does not seem to contemplate repairs or maintenance. I suppose the comptroller has held, however, that it does.

Col. BURR. Possibly, if it has been submitted to him; but I do not know that the question as to the application of that to repairs has ever been raised. We have and usually do have repairs. Of course, Mr. Chairman, repairs to structures like sea walls practically mean construction work; in other words, if a sea wall becomes damaged it involves construction sometimes to the extent of reconstruction.

Mr. SHERLEY. Following this item are various items as to particular places. Perhaps it might be well to take them up in detail.

Col. BURR. These items in detail show a total estimate of \$25,000; they include such items as have been reported by the district officers as more or less urgent, more or less necessary. Of course, as stated last year, if the money is not appropriated we can not do the work. We can not say that damage will result and under normal conditions, without excessive stress of weather, possibly no material damage would result; it is merely a gamble. We have two large items of work which are not included here and in which there is quite a broad gamble; one of them is at Savannah where, through lack of attention and lack of necessary work the Government might, under certain conditions of storm and stress, suffer very material damage. The other is at Galveston, where there was material damage suffered in a great storm and where, with a repetition of those conditions, we might again suffer damage; but neither of them is in the estimates this year.

Mr. SHERLEY. Under the heading "Miscellaneous" you have an available balance of \$889,120.72. The committee would like to know just how that balance came to be accumulated, whether any of it is

allotted or expects to be allotted, and what could be diverted to other matters.

Col. BURR. I can, on analysis, give you the items that go to make up that item, but it has not been analyzed in my papers in detail. However, I can take up certain items. For instance, at New York, N. Y., there is a balance unexpended, as of June 30, 1911, of \$13,509.86—that is the balance unexpended from the appropriation of June 6, 1902, for the riprap stone wall on the eastern beach at Sandy Hook, N. J., for the protection of the reservation at that place, which includes the ordnance proving ground and the post at Fort Hancock, which is one of the important defenses of the New York Harbor. The work has been done and is completed. There is no evidence in sight of any certain necessity at the present time for using the balance of that appropriation. However, the sea does curious things, as we all know who work along the coast, and while the work has been completed within the appropriation made and there is this balance left, it is impossible to state whether it will ever be needed or at what time it may be needed.

Mr. SHERLEY. In that event it could very easily be estimated for and allowed subsequently?

Col. BURR. Sometimes it can be; but it takes many days, Mr. Chairman, to get an appropriation after the necessity arises and it is known that work should be done on the coast where the sea is making an inroad into a sandy beach, and if any length of time intervenes there would be some damage. However, there is no apparent need for it at the present time. If it is deemed wise to take chances on it, the funds can be turned in. We can see no present need for using those funds for the purpose appropriated.

SEA WALLS AND EMBANKMENTS, HAMPTON ROADS, VA.

Mr. SHERLEY. Now, at Hampton Roads, Va., I note a balance returned to the surplus fund of \$5,908.05, February 24, 1891, and on August 1, 1894, balance returned to surplus fund \$10,472.69. What is meant by "returned to surplus fund"?

Col. BURR. It means that the sum has reverted to the Treasury and is not longer available for expenditure. When a balance is turned into the Treasury in that form, it reverts to the surplus fund and becomes a part of the available receipts of the Treasury and ceases to be available as an item of appropriation.

DEFENSES AT FORT MOULTRIE, CHARLESTON, S. C.

(See also p. 154.)

Mr. SHERLEY. The next item of balance unexpended is June 30, 1911, \$8,992, out of appropriations made in 1905 and 1908 for the construction of sea wall necessary for the protection of Fort Moultrie, Charleston, S. C.

Col. BURR. That is an unexpended balance of appropriations made for the purpose just stated. That sum is in the excess of the appropriation over the cost of the work, which is now completed and for which we can see no present use or application for the purpose for which it was appropriated. We have suggested in the estimates—and this is one of several similar items—that this balance be made

available for certain other purposes in connection with the defenses of Charleston, for which the original appropriation was made. The action in that case can well follow along the action which may be taken on the items which follow it and which are larger and of more importance than this particular item.

Mr. SHERLEY. This is, in other words, a request for an increase in the appropriation for electrical power and appliances?

Col. BURR. Our point of view is this: The appropriation has been made; there is a balance available which is not needed to accomplish the purpose of that appropriation. That balance can not now be used for any other purpose; and since we have certain other work to be done, we would be glad to utilize that balance to accomplish this other work if Congress will permit us to do so.

Mr. SHERLEY. But in point of fact it means to increase the appropriation for electric lights and power plants to the extent of the balance?

Col. BURR. Yes; but that increase would be applicable only locally.

Mr. SHERLEY. It would be localized?

Col. BURR. Yes, sir; at Charleston, of course. That would be so much money applied to accomplishing and completing the work of installing searchlights, etc., but we do not attach any great importance to the point of localizing it at Charleston or anywhere else.

Mr. SHERLEY. Is the need at Charleston as great or greater than at any other place?

Col. BURR. No; no greater than a number of other places.

Mr. SHERLEY. Is it as great?

Col. BURR. It is the average. The installation is partly completed at Charleston. We have a request on our books for power plant installation at Fort Moultrie, but we have not been able to meet it at the present time. Our main idea was this: That for certain reasons, which seemed good and sufficient to Congress, the original appropriation was localized at Charleston, and we have merely assumed that if the balance of it is to be expended, Congress, perhaps, would prefer to localize the expenditure of the balance just as it localized the expenditure of the original sum.

Mr. SHERLEY. However, Colonel, there is this distinction: The localization of the original sum was because of the character of the work, it having been work for a sea wall there; it has never been the policy of this committee to localize for many reasons, some of which are very apparent, any appropriation for a general purpose like electric light and power plants, or armament or emplacements, although the committee may be in possession of facts which indicate that the money is intended for a particular locality; such appropriations have always been in general terms and not localized.

Col. BURR. We agree with the committee on that scheme of appropriation, Mr. Chairman, I should say, and, as a matter of fact, the Engineer Department keeps faith with the committee in matters of that sort as strictly as though the appropriation were made for a specific locality, when it is made upon the estimate of the department that it was to be used in certain localities. For instance, the first time I appeared before the committee, on my present duty, was a year ago last June, when we had a deficiency in the sums available for certain pieces of work in the Philippines. We had sufficient funds avail-

able in the general appropriation for fortifications in the Philippines, but it had been stated to the committee that those funds were to be used for certain other purposes apart from the work covered by this deficiency, and we did not feel justified in using them on the work which the deficiency covered without communicating the fact to the committee and practically getting its consent, there being no need to appropriate additional funds except to keep faith.

DEFENSES OF PENSACOLA, FLA.

(See also. p. 155.)

Mr. SHERLEY. The next item I have in this statement shows there is an unexpended balance, June 30, 1911, of \$12,279.46, out of an appropriation for repair and restoration of batteries and other structures appurtenant to the defenses of Pensacola?

Col. BURR. The items referred to were for application specifically to Pensacola and were made for the repair of storm damages and for such additional work in the shape of sea walls, and otherwise, as was necessary to avoid similar damages in the future. The balance unexpended is largely made up from the appropriations for the construction of sea walls, etc., and, as stated, of June 30, 1911, is \$462,603.31.

Mr. SHERLEY. That is under the acts of March 2, 1907, and March 3, 1909; but there is a previous item, \$12,279.46, under the acts of March 2, 1907, and May 27, 1908, repair and restoration of batteries and other structures appurtenant to the defenses of Pensacola, and for retaining walls to protect batteries from floods.

Col. BURR. That is correct. Those figures are all of June 30, 1911. The work is not completed; it is still in progress at Fort Pickens, and certain projects for the expenditure of part of that balance have been approved since June 30, 1911.

Mr. SHERLEY. How much is that balance?

Col. BURR. I did not expect to go into that matter in detail, and while I have sent for the papers, I do not know that I can give it offhand even from these papers. We have estimated that the balance that will remain unexpended on the completion of the work under the acts of March 2, 1907, and March 3, 1909, will probably be some \$29,000, as estimated on May 27, 1911. I am reading from a memorandum sent up to me. This balance was estimated to be probably \$40,000; since then some additional work has been authorized which reduced the possible balance, after the completion of the work, to approximately \$29,000.

Mr. SHERLEY. In other words, it is estimated that of the balance unexpended on June 30, which was \$462,000, there will be \$433,000 needed to complete the sea wall?

Col. BURR. Yes; that is the present estimate.

Mr. SHERLEY. How much work is being done in the building of the sea wall?

Col. BURR. The sea-wall work is well along toward completion, so far as the sea wall itself is concerned.

Mr. SHERLEY. The appropriation is only for a sea wall; it appears to read that way from the summary I have here.

Col. BURR. I would like to see the full wording of it before going further.

SEA WALLS, FORTS PICKENS AND M'REE, PENSACOLA, FLA.

Mr. SHERLEY. This says "Sea walls for protection of the sites of the fortifications and of the necessary post buildings at Forts Pickens and McRee, Pensacola, Fla., \$907,100." Now, previous to that there have been the other appropriations, making a total appropriation of \$907,100 for that purpose.

Col. BURR. May I say that as to the appropriation under the act of March 2, 1907, it is a question of the interpretation of the wording of the law?

Mr. SHERLEY. I have before me the act of March 2, 1907, and will read the following:

Toward the building of sea walls for the protection of the sites of the fortifications and of the necessary post buildings at Forts Pickens and McRee, Pensacola Harbor, Fla. (to cost not to exceed \$907,100), \$400,000.

Now, you gentlemen have not been construing that as authorizing money except for sea walls, have you?

Col. BURR. I will want to study the language of it a little more closely than I am able to do at present in order to determine exactly the situation. But we have been construing that appropriation to include certain work for the protection of post buildings, etc., inside the sea wall. Of course, a sea wall alone would be insufficient in a general case for the thorough protection of a locality such as that unless you built the sea wall sufficiently high to prevent the water from going over it.

Mr. SHERLEY. What other sort of work have you been doing?

Col. BURR. We have been backing up the sea wall with a fill, and our present estimates and projects include such a fill as will relieve the situation at Fort Pickens, which results from the passage of storm water over the sea wall and from storm tides and backwater flooding low areas within the wall. This sea wall is not sufficiently high to prevent all storm water from passing over it. A certain amount of water will pass over the sea wall, and it is necessary, therefore, to build your sea wall and backing so as to protect the buildings not only from water in front of the wall but storm-tide damage in the rear. Things should be guarded in such a way that this storm water can not go over the sea wall, and thereby reduce to the minimum the damage to the works behind the wall. Now, at Galveston, for instance, where they have gone elaborately into the construction of sea walls to prevent damage such as arose from the severe storm of some years ago, they have found it necessary to back up the sea wall with an earth fill of a certain width and, further than that, to pave this earth fill over a certain width in the rear of the wall so that the water passing over the top of the wall will not damage the fill placed behind it, and that paving, in effect, is in the form of a roadway. And so you find it, not only in the case of the sea wall built by the city of Galveston itself, but the sea wall built by the Government at Fort Crockett, which is adjacent to and practically a continuation of the city wall.

The sea walls that we are building at Pensacola are much less elaborate than the sea walls built at Galveston; they are lower and of much cheaper and more economical type of construction, but the water does go over the top of them in storms, and to prevent what

we engineers would call overfall—that is, water falling behind the walls—you have got to protect the wall in the rear as well as in the front. And that fill and paving will form there, as it has formed at Galveston, a roadway on the inside of the wall. Moreover, our projects include minor grading throughout the area of the post, so that the water coming over the top of the wall will be cared for with the least possible damage to the structures. That is the understanding of the project at the present time, so far as the sea wall is concerned.

Mr. SHERLEY. Well, is the project merely one for the protection of the post or does it go, in its ramifications, to the improvement of the post grounds?

Col. BURR. The work will incidentally and very materially improve the condition of the post within the sea wall.

Mr. SHERLEY. That I can understand.

Col. BURR. That can not be gainsaid.

Mr. SHERLEY. The point I am getting at is whether you are simply doing work necessary to protect the property or whether under the wording of this act you have gone ahead to expend all of this money for purposes other than just protection pure and simple?

Col. BURR. We have gone ahead to expend it, as we considered it, for the purpose of protection. I happen to have here the original project for the expenditure of this fund, June 2, 1909, to complete the sea wall at Fort McRee, being the fort on the opposite side of the entrance to Fort Pickens.

Mr. SHERLEY. How near is it to the town of Pensacola?

Col. BURR. From the town of Pensacola to the entrance, about 10 miles; I did not go down all the way by water, I went part of the way by trolley, but I think it is about 10 miles. Fort McRee is on the opposite side of the entrance to Fort Pickens. The latter is the more important of the two and covers the channel more fully. [Reading:]

To complete the sea wall at Fort McRee and to raise the level of the inclosure to within about 4½ feet of the top of the wall, and cover the same with a thin coat of rich earth and set out Bermuda grass roots.

In explanation of that I will say that it has been the common practice along the coast, where it is desired to retain a sand fill, to encourage the growth of sand grasses or other vegetation that will hold it to such an extent as will prevent the wind from blowing it away. [Reading:]

To make a back fill behind the Fort Pickens wall, the fill to be about 100 feet in width and raised to elevation 8.5, or within 4½ feet of the top of the wall, and to provide a suitable roadway alongside of the wall; for the protection of the same, a strip of fertile earth planted with Bermuda roots on the inside of the roadway. The riprap on the interior side of this wall was omitted in the original plan, it being the intention to support the back of the wall with sand fill, as above outlined.

That is the original project for the expenditure of this money in 1909.

Mr. SHERLEY. The original project did not contemplate a road.

Col. BURR. Yes; it did.

Mr. SHERLEY. Is that road purely for the purpose of protecting the wall, or is it only for the purpose of creating a road?

Col. BURR. It is intended for the purpose of protecting the wall.
Mr. SHERLEY. Is it necessary for that purpose?

Col. BURR. Yes; and this quotation, which I have just read to you from the project of June 2, 1909, states that "the riprap on the interior side of this wall was omitted in the original plan, it being the intention to support the back of the wall with sand fill, as above outlined." In other words, the original plan, which contemplated backing up this sea wall with riprap stone, was modified to include a back fill with sand; the sand fill itself must be protected immediately in the rear of the wall. Gulf sand is very light and very fine and, like any other sand, it would be subject to erosion by the water going over the top of the wall, which is not a high wall.

Mr. SHERLEY. Did that modification cheapen or add to the cost of the wall?

Col. BURR. Not having the estimate with me, Mr. Chairman, and this having been acted upon before I took up the work, I am not thoroughly familiar with it. As to that I can not say, but I can imagine this, that considering the general result to be obtained, the protection of the wall by a sand fill instead of riprap and the construction of a paved roadway on top of the sand fill would be more beneficial in the long run to the reservation, as a whole, than riprap protection in the rear of the wall, and should be utilized certainly if it cost no more and possibly if it cost slightly more. The Pensacola sea wall is a relatively low wall.

Mr. SHERLEY. Is this road made a part of any of the roads of Pensacola?

Col. BURR. No; Fort Pickens is at the western end of a long island, known as Santa Rosa Island; it is some 30 miles long, extending east and west on the coast and is separated from the mainland. There is practically nothing on the island except the Government's installation at Fort Pickens, since the Government owns the whole island. Only one or two permits have been issued to private parties to occupy parts of it that are not used for military purposes. So that Fort Pickens and this sea wall are entirely separated from any other highway system in the State of Florida or elsewhere. As a matter of fact—I do not believe I have a plan of it—the sea wall merely incloses a limited area at the west end of Santa Rosa Island, but I can not give the figures in acres.

Mr. SHERLEY. Now, is the major portion of this \$462,000 due to the enlargement of the original plan, or how does that come about?

Col. BURR. It is merely a continuation of the original plan, Mr. Chairman. The work has progressed slowly. The very first thing to be done was the construction of the sea wall itself—a bulkhead, so to speak—that would protect the interior area from the sea. On the seaside it consists of a concrete wall, and on the harbor side it is built of riprap. Since that has been completed—that is, the work originally undertaken at Fort Pickens—the question has been brought up, as it was in this letter which I have here of May 27, 1911, as to the completion of the project—that is, the completion of the items of the work incidental to the construction of the sea wall, and, in addition, to the bare construction of the sea wall itself. Those items include the two that I have just read to you with regard to backing up the sea wall with a sand fill and protecting the top of the sand fill with a paved area, which serves as a road, and

include two other items of the original project of June 2, 1909, which I will read:

(c) To construct retaining walls in rear of batteries Cullum, Van Swearingen, Pensacola, and Center, as provided for in estimate from this office, dated November 6, 1906.

Evidently included in the original estimate of this work before the appropriation was made.

No work has been done under this head. (d) To place additional riprap on the north face in front of the wall at Fort Pickens, this riprap being in addition to that provided for in the present contract and considered necessary to fully protect this face of the wall.

The statement is made that this work has been completed. The estimated cost of completing work to be done under the project of June 2, 1909, was stated as \$137,500, but the total work recommended to be done is as follows:

(a) To cover with fertile earth and to plant Bermuda grass over the area inclosed by the sea wall at Fort McRee. (b) To bring the elevation of the entire inclosure within the sea wall at Fort Pickens to 7 feet above mean low water by filling in with sand, and by leveling where the surface is above 7 feet; to cover the same with fertile earth and Bermuda-grass roots. (b 1) To fill for a width of about 100 feet along the bay (or north) face of the wall to an elevation of 7.5 feet. (b 2) To construct a concrete walk, 6 feet in width, along the north face of the wall and a suitable roadway along and inside of this. The roadway to be of brick or other suitable material. (c) To construct retaining walls and other additional protection to magazines of battery Cullum; also retaining walls, as may be necessary, in rear of batteries Van Swearingen, Pensacola, Slemmer, and Center. (d) To repair the engineer dock at Fort Pickens, at an estimated cost of \$6,000. This dock was used continuously during the erection of the sea wall, and it is necessary to repair it to the extent estimated in order to place it in approximately the same condition in which it was prior to use during construction of the sea wall. The estimated cost of this work is, approximately, \$400,000.

That is a statement of what is contemplated to do with these balances.

Mr. SHERLEY. That would leave about \$74,000? You now have \$12,279.46 in one item and \$462,603.31 in the other; the two together would make \$474,882.77, and \$400,000 to finish the work, as just stated, would leave \$74,882.77.

Col. BURR. Yes; the funds are applicable in slightly different ways.

Mr. SHERLEY. I understand.

Col. BURR. But we would have a balance available. Are you considering this transfer?

Mr. SHERLEY. Whether we make the transfer, as stated, or whether we use it for some other purpose, we want to arrive at what the balance is going to be.

Col. BURR. From the figures as stated, as of June 30, 1911, the balance would be as you have just given it.

Mr. SHERLEY. What you request is that that amount shall be made available for searchlights and power plants at Pensacola Harbor?

Col. BURR. Yes.

Mr. SHERLEY. Which is, as I said awhile ago, simply asking that much of an increase for those two items?

Col. BURR. Yes, sir; and it is being asked for in that form for the reason stated in regard to the Charleston item. In other words, we have, or expect to have, certain balances available, and if Congress will permit us to use them rather than to revert—

DEFENSES OF MOBILE, ALA.

(See also. p. 155.)

Mr. SHERLEY (interposing). I notice that at Mobile, Ala., the statement I have here shows a balance unexpended, June 30, 1911, of \$132,161.61, that being out of moneys that were appropriated in the act of March 2, 1907, and the act of May 27, 1908, for the repair and restoration of batteries and other structures appurtenant to the defenses of Mobile, Ala., and rebuilding sea walls and groins for protection of the sites of the fortifications and of the garrison posts. Is that an actual available balance with all the work done?

Col. BURR. The balance of appropriation not required, as we find it now, is \$111,000. I am reading from some notes with which I am not thoroughly familiar, Mr. Chairman. The balance is stated in the annual estimates, page 329, to be about \$111,000.

Mr. SHERLEY. As of what date?

Col. BURR. I can not state; I am just reading from bookkeepers' notes.

Mr. SHERLEY. This shows \$132,161.61 as of June 30, 1911.

Col. BURR. I appreciate that. The \$111,000 as compared with the \$132,000 is the balance that will be available after the completion of the work that is in hand or allotted for, and the expenditure of the sums necessary for its completion would reduce the \$132,000 to \$111,000; that is the case.

Mr. SHERLEY. In going over your notes please ascertain accurately as to that item and as to similar items, so we will know when we get your revised notes the exact balance that exists after the completion of these projects wherever it is ascertainable.

Col. BURR. As stated in the estimates, as we estimated it at that time, the balance expected to be available after the completion of the work was practically \$111,000. Since that time it has been determined that certain minor items of work which were intended to be done previously were not considered; and these items amount to \$3,000, and the apparent balance is therefore raised to \$114,000. Since then there have been some subsequent allotments against this appropriation amounting to \$6,725. This shows, Mr. Chairman, how these things shift from day to day and from month to month. So far as we can determine, the balance now is \$107,275. The state of affairs changes from month to month and from day to day. As estimates for additional work under this appropriation for the restoration of these batteries at Mobile have come in we have made allotments for the work. We have even made allotments, as I have just shown, since the 30th of June, and possibly if the balance is not turned in and it is continued long enough we will probably find some other items of repair to which we might reasonably consider it applicable. But the statement that I have just read shows that there are some things which are applicable at one time and ruled out at another.

SEA WALLS, FORT CROCKETT AND FORT TRAVIS, GALVESTON, TEX.

(See also. p. 155.)

Mr. SHERLEY. Now, go to the next item. I find at Galveston, Tex., that there was an appropriation made in the act of March 1, 1901, for the reconstruction and repair of fortifications at Galveston, Tex.,

and that there appears to be a balance out of that appropriation of \$10,245.77; and out of the acts of April 28, 1904, and June 30, 1906, for sea wall and fill at Fort Crockett, a balance unexpended of \$14,754.58, and out of the act of March 3, 1909, for sea wall and fill at Fort Travis, a balance of \$234,574.13. Now, what is the actual condition as to those balances? Are those various projects completed?

Col. BURR. The largest item of the balance on June 30 was appropriated for a sea wall and fill at Fort Travis. That work was in progress at the end of the fiscal year, June 30, and still is in progress. While not completed, we have secured approximate estimates as to the amount necessary for its completion and the balance which will probably remain unexpended upon completion. The figures that I have in mind are \$80,000.

Mr. SHERLEY. Now, as to the other two balances of \$10,000 and \$14,000, a total of about \$25,000.

Col. BURR. I can not state definitely as to those two balances; I am not myself familiar with them. It is proposed to utilize the balances which may remain and which are not yet accurately determinable from the Fort Travis appropriations for the improvement, with the authority of Congress, of the Fort Crockett Reservation on the land side, and this item in the bill is for the purpose of utilizing them for that purpose. Just what the amount will be when the Fort Travis work is completed we can not say definitely.

Mr. SHERLEY. Have you any estimate as to the expenditure that will be necessary in case we make the authorization requested here?

Col. BURR. We have had estimates following two lines—one merely to build a wall to support the sand fill of the Fort Crockett Reservation on the land side, as has been done in the case of Fort Travis; the other is to support that fill by an additional sand fill. The material on the beaches along the Gulf coast is very fine sand and will only stand on a very flat slope; if the slope is left steeper than, I think, about 1 in 20, it will erode and wash down until it finally reaches that slope. Now, the project for constructing a vertical wall, rather low, on the land side of the Fort Crockett Reservation, is somewhat cheaper than the other, but the second project, for separating this fill on the land side by extending it, so to speak, with a gentle slope until it reaches the ground, is one which will very materially improve the sanitary conditions in the vicinity of the post. The ground in the rear and to the right of the rear of the Fort Crockett Reservation is low and holds water; the sanitary conditions, therefore, are bad. The authorities are of the opinion—and in that we must agree—that it will be better to apply funds to accomplish the purpose of securing the reservation at Fort Crockett, and at the same time improve sanitary conditions in the neighborhood. It might be added here that there are certain local interests that are desirous of increasing the reservation at Fort Crockett on the land side by including the area which would be covered by this additional fill. It is believed that an increase in the size of the reservation would be desirable if it could be secured.

Mr. SHERLEY. For what reason?

Col. BURR. As an encampment for troops, if for no other purpose.

Mr. SHERLEY. How much area is there now?

Col. BURR. I can not give the figures, but I will insert them, and the additional area that would be included in this increase I will also include. When the troops were brought together at Galveston last March there was room on the reservation only for part of the three regiments that were sent to Galveston; one of the regiments had to be camped off the post. Moreover, in these days everyone recognizes the mosquito not only as a plague but as a sanitary danger in respect not only to yellow fever but more commonly in this country with respect to malaria, and anything that can reasonably be done, without materially increasing the expenditure, to actually protect Government property and improve sanitary conditions, not only in the post but in its immediate vicinity, is well worth the doing. That is the main argument in favor of the slightly different cost of the sand fill over a retaining wall.

Mr. SHERLEY. What are the respective costs of the two projects?

Col. BURR. I can not put my hands on the figures in detail, but they are relatively small; approximately for the wall something under \$80,000, I think slightly under \$80,000, and for the sand fill it is probably not more than \$15,000 additional. I will insert the correct figures.

Mr. SHERLEY. How pressing is the need for this work?

Col. BURR. It is desirable, but, like much other work, can be postponed if we can not get the money for it; but in the meantime the Government's property is suffering on that side.

Mr. SHERLEY. What do you mean by suffering?

Col. BURR. We have built at this place a rough rubblestone wall laid dry; that is, without mortar between the stones. The sand is very fine and is gradually leaching out through the wall and causing difficulty in maintenance. The main question at this time has probably come up through the fact that this Fort Travis work will be completed within the next year or during this fiscal year, and that the balance will be available for other purposes for which it might well be used.

NOTE.—Experience has shown that the dry rubble wall is unsatisfactory. Rain water flowing over the wall undermines it, a part of the wall falls into the hole so formed, and the filling escapes. It has become necessary to build an earth levee a few feet back from the wall and to conduct the water over the wall through pipes projecting over its face to prevent undermining. This is merely a temporary expedient, and washouts occur after every heavy rain. The original estimates in 1910 were \$115,000 for a wall similar to that built at Fort Travis, or \$50,000 for a sand fill. The low figures for the sand fill were due to the existence of a very favorable contract which could not be taken advantage of by reason of absence of sufficient funds applicable to the purpose. This contract has since expired. Later estimates (August, 1911) developed a more economical type of wall estimated to cost \$50,000 and made the cost of the fill to be \$88,000, in the absence of contract conditions so favorable as in 1910. The area of the present reservation at Fort Crockett is 125.57 acres, and the additional sand fill, besides protecting the existing fill on the reservation, will raise and make available and sanitary about 45 acres additional that are now low and insanitary, at an additional cost of \$38,000. The available and unexpended balance of \$14,758.58 of acts of April 28, 1904, and June 30, 1906, for sea wall and fill at Fort Crockett is applicable to this work, and the balance to remain unexpended of the appropriation of March 3, 1909, for sea wall and fill at Fort Travis upon the completion of that work (now in progress) is estimated at this time at \$67,000. If this last balance is authorized to be applied to work at Fort Crockett, there will be available for that work approximately \$81,758.58, which is sufficient to build the wall, and is nearly sufficient to place the sand fill, and may prove to be entirely sufficient for the latter.

SATURDAY, JANUARY 13, 1912.

**STATEMENT OF LIEUT. COL. EDWARD BURR, ASSISTANT TO THE
CHIEF OF ENGINEERS, UNITED STATES ARMY—Continued.**

Mr. SHERLEY. Col. Burr, I believe on yesterday, at the end of the hearing, we had just finished the consideration of the item relating to the fill at the Fort Crockett Military Reservation.

CONSTRUCTION OF SEA WALLS AND EMBANKMENTS, SANDY HOOK, N. J.

Col. BURR. Before you take up the next item, if that is what you have in mind, I would like to add some additional facts regarding the balance unexpended of \$13,509.86 of an appropriation for a riprap stone wall, Eastern Beach, Sandy Hook, N. J. On December 13, in reply to a letter from the Chief of Engineers' office, the district officer reported, with regard to that work and the necessity for retaining the balance rather than turning it in to the surplus fund, as follows:

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
ROOM 707, ARMY BUILDING,
New York City, December 13, 1911.

The CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C.

SIR: 1. In reply to your letter of November 18, 1911 (37063), I have the honor to report that I yesterday inspected the riprap sea wall along the easterly beach at Sandy Hook, N. J., near the lower end of the peninsula, to the credit of which there remains an unexpended balance of \$13,509.86 from an allotment of \$75,000 made in fortification act of June 6, 1902.

2. The two ends of the riprap wall remain in good condition, having in front of them a sand beach which breaks the force of the storm waves. The middle section has been severely attacked. Shortly after the construction of the wall a deposit of sand occurred along this middle section similar to the deposit now existing at the two ends. Three years ago the seas began to wash the deposit away, and at the present time practically all the sand has been washed away to a level of a little below low tide, leaving the sea slope of the wall fully exposed to the action of the sea. The wall itself was originally made 20 feet wide on top, but has been very much reduced. In places it is now less than 10 feet and in some places the entire wall has been lowered from 2 to 3 feet, leaving it in a serrated form.

3. That additional stone will be required for this middle section within a year or two seems very probable. There is now no immediate danger, but as the disintegration is progressive the time will come when more stone will have to be placed on the middle section of the riprap wall.

4. For the above reasons it is recommended that the above-mentioned balance be not withdrawn, but left to the credit of the work to meet any emergency that may arise.

Very respectfully,

S. W. ROESSLER,
Colonel, Corps of Engineers.

So, acting accordingly, we took no steps for turning in the unexpended balance to the surplus fund. In view of the fact that general statements along the same line were made yesterday, it seemed desirable to add this additional information, which I overlooked at the time; that is, information showing the desirability of holding on to that balance of appropriation.

DEFENSES OF KEY WEST, FLA.

(See also p. 157.)

Mr. SHERLEY. The next item is:

Defenses of Key West, Fla. For repair and restoration of structures appurtenant to the defenses of Key West, Fla., \$36,000.

Col. BURR. That item is, in a sense, an emergency item, to make such repairs as are necessary, resulting from severe storms in the fall of 1910. Such repairs have already been made as could be accomplished with the balances available from funds for maintenance, but there were some larger items of work necessary to replace the structures in the condition they were before the storm and which we can not accomplish with the current appropriations for maintenance. The facts are about as follows: On October 14, 1910, a hurricane with a wind velocity of 60 miles was successfully withstood by the wharf at Key West, but on October 17—only three days later—a second storm, the velocity of which reached 105 miles an hour, wrecked the approach to the wharf. The head of the wharf, which projected further into the water, is of more substantial construction and practically withstood even this exceptionally severe storm without any material damage. The portion connecting the head of the wharf with the shore was practically wiped out entirely. So that we now have the wharf head standing out in the water by itself with no shore connection, and in its present shape it is useless. This wharf furnished, practically, the base of operations for the torpedo service at Key West.

Mr. SHERLEY. I have just received a statement from the Chief of Engineers in explanation of the item of \$25,000 for the construction of sea walls or embankments, and I find that one of the items is for Fort Taylor, Key West, Fla., \$9,500; is that proposed work distinct from the work that is expected to be done under this \$36,000?

Col. BURR. I have not been handling the routine papers and I am not familiar with the letter.

Mr. SHERLEY. The letter just received bears the date of January 10, and incloses one of January 5, and it states that the estimate of \$25,000, submitted for the construction of sea walls and embankments, is to be distributed at various forts, and among others it names Fort Taylor, Key West, Fla., \$9,500.

Col. BURR. It is a separate item. The \$9,500 mentioned in that statement is for repairs of structures of that character at Key West which were severely damaged during this storm. This item of \$36,000 is solely for the repair, practically the reconstruction, of a portion of the torpedo wharf; it is a separate item. The sea-wall repair item is merely in a class with other repairs to sea walls which are desirable when funds become available and as soon as funds become available. It is not essential at this time any more than other sea-wall repairs are, but this item for \$36,000 for the repair of the wharf is absolutely essential.

The wharf, as I stated a moment ago, is the base of operations for the torpedo service in Key West Harbor, and the portion destroyed cuts off the outer portion of it from the land, and the wharf is useless in its present condition. Therefore no operations looking to the laying of torpedoes in the Key West Harbor in case of emergency can be carried on with the wharf in its present condition, and the

wharf must therefore be repaired in order that that may be done, and this sum is the estimated cost of doing the work. In that connection I might add that these storms at Key West in the fall of last year were of exceptional severity. There has been a common saying that, while these West India hurricanes touched every other place on the Gulf, including the island of Cuba, Key West seemed to be in such an angle that it was not affected by them, but not only in the year mentioned, 1910, but during the previous year, I think it was, they had two exceptionally severe storms. The storm of 1910 was unusual in that locality, although there was no loss of life suffered by it, as there had been in the storm the previous year.

Mr. GOOD. Of what material is the sea wall constructed?

Col. BURR. Concrete or stone, depending upon the locality and availability of stone. In Key West it would probably be of concrete, since along the Gulf coast no suitable stone is available.

Mr. GOOD. How does a storm affect the concrete—undermine it?

Col. BURR. Usually undermines the wall. The battering effect of the storm is enough to destroy work of that sort, where the storm is of unusual severity. There is one thing that all engineers appreciate who have to do with works along the coast, that occasionally a storm of unusual severity occurs which almost no structure will resist, and structures built with reasonable economy to withstand ordinarily severe storms are more or less damaged by them, and sometimes completely destroyed. That is the case with structures that are built with particular attention to resistance of storm damage. breakwaters, for instance.

PRESERVATION AND REPAIR OF STRUCTURES FOR TORPEDO DEFENSE.

Mr. SHERLEY. The next item is:

For preservation and repair of structures erected for the torpedo defense of the United States.

What balances have you under that item?

Col. BURR. As of date November 30, 1911, the balances under the appropriation for preservation and repair of structures were as follows: Unexpended, \$15,100.57; available, allotted, \$11,610.42; available, unallotted, \$2,283.58; total available, \$13,894. In connection with these balances, Mr. Chairman, I would like to state what I was unable to do yesterday, that the first column represents the unexpended balance in the hands of disbursing officers or district officers, of the funds allotted to them; the second figure is the available allotted balance in their hands, the difference being outstanding liabilities unpaid; the third column is the balance available, unallotted, on the books of the department, and the fourth is the sum of the second and third, being the total unencumbered balance remaining of that appropriation on that date, allotted or unallotted. The portion of the unencumbered balance allotted may be and probably is more or less encumbered by plans which the district officer to whom it has been allotted may have in mind, but which plans have not reached the stage of actually incurring the liabilities, although the work may have progressed to such an extent, in part at least, that further liabilities must be incurred to finish the work already in hand. The only actual free balance is the unallotted balance.

Mr. SHERLEY. That is the only balance that you know is necessarily free; the other may or may not be used by the district officer?

Col. BURR. That is true. I was going to add that a portion of these balances of funds allotted are undoubtedly encumbered at this time, but like other maintenance funds a certain portion of them is held to the end of the fiscal year, in order that funds may be in hand to meet emergencies.

Mr. SHERLEY. At the end of the fiscal year, in the event there is any unused portion of the allotted fund in the hands of district officers, is that still held by them to their credit or does it revert to the main office for reallocation? What is the practice?

Col. BURR. It remains to their credit, but we take into account their unencumbered balances in making allotments for the following year. The allotments are made on the same basis as for preservation and repair of fortifications, consideration being given to the first cost of the structures in each district where these funds would be applied. We try in this case, as in the case of fortification repairs, to hold down the allotment of funds for purposes of general repairs to the minimum of approximately 1 per cent. Any additional funds needed above 1 per cent, and in some cases less than 1 per cent, must be explained by special estimates stating the need for these special funds and the case must be proved to such an extent that the department is justified in making the emergency allotment for the work, bearing in mind that we always have estimates on our books for more work than the funds available will permit, and that we must distribute the funds where the necessity is greatest.

Mr. SHERLEY. Your estimates, then, of necessity, are submitted each year without a knowledge of what balances may or may not remain in the hands of district officers out of the allotment of the current year?

Col. BURR. You mean the estimates submitted to Congress?

Mr. SHERLEY. Yes.

Col. BURR. That necessarily must be so, because our estimates for the fiscal year 1913, which we are discussing at this time, were made up in July and August, 1911, 11 months before the end of the current fiscal year, and as to these maintenance funds we can not be fully informed as to what balances the district officers are going to have 11 months later. But since we know that these allotments have been made to cover only items reported upon, and which recur in some cases from year to year, we know, as a general rule, that the district officer will have a small balance at the end of the year.

Mr. SHERLEY. In point of fact what has been the usual amount of the balances that have been in the hands of district officers from year to year—has it been small or large?

Col. BURR. It has been, as a rule, small. In some cases the district officers carry over their balances longer than in others, but the balances in their hands are never at any time sufficient to meet the demands for all the work necessary in their districts, and if balances are carried over beyond the end of the fiscal year, it is merely because precedence has been given to some other particular piece of work. At the present time we are discouraging officers from carrying over any balances—that is, we are encouraging them to do their work promptly, work that is necessary and for which this money has been allotted—

and that is being done by giving very close consideration to their balances at the end of the year and by taking these balances into account when we make allotments for the next year. Fortification work, with its many details, is slow of accomplishment at times, particularly since, for purposes of economical administration, Mr. Chairman, we maintain only a small working force in each district, a force sufficient to meet all emergencies, but which is not large enough to accomplish rapidly and in a very short time all the work necessary each year in a district. Naturally, with that economical system of administration, the work carries over longer than it would if we put in a sufficient force and shoved the work through to completion quickly.

Mr. SHERLEY. I notice that the unallotted balance, as given in the statement submitted to the committee, in November was \$38,163.40. Do you know just at what time that unallotted balance was determined?

Col. BURR. The balance that you are quoting from, I think, is from the general statement that was made up at your request, of past expenditures and balances, etc., and as that request came to the department in August, I think, and as it involved a great deal of labor in going over the books, it was necessary, for coordination between all the departments that were concerned in these figures, to fix some date that would be used in all of them as the basis of these figures submitted to you. The most convenient date at that time, and the most convenient date at any time, is, ordinarily, the end of the fiscal year, so that June 30, the end of the last fiscal year, was used as the date upon which to base the figures submitted.

Mr. SHERLEY. Did that include the appropriation that had become available at that very moment, or exclusive of it?

Col. BURR. It includes the appropriation available at that time. The fortification appropriation bill is not, in the terms of its expenditure, a fiscal-year bill. The funds become available as of the date of approval; so, as the fortification bill had antedated the end of the year, we took credit on our books for the appropriations carried in it. If I remember right, in connection with this item of balances for defenses that came up yesterday, the comptroller held, as he did in the case of the Panama Canal appropriation, that it was not available until the 1st of July.

Mr. SHERLEY. Then you had last year, at the end of the fiscal year, \$18,000 in addition to the \$20,000 that had been appropriated for the coming year, making a balance of \$38,000. What I am trying to arrive at is how close your estimates are borne out by the actual developments subsequently. Now, your estimate for last year was necessarily made up some time ahead, and you asked \$30,000 and received \$20,000, and it developed that at the end of the fiscal year preceding that appropriation you had an unallotted balance of \$18,000.

Col. BURR. Our estimates are based on the facts which we know, that the amount asked for can be and should be effectively applied for the maintenance of these structures. Of course, if we do not get that much money we can not utilize it, and some repairs and maintenance fall back and can not be attended to. The situation with regard to carrying over balances on this appropriation is the same as I stated yesterday in the matter of preservation and repair to fortifications. The district officers do not expend all of the funds allotted to them for upkeep until other funds are in sight for the same pur-

pose, and that is reasonably good administration. The department does not at the beginning of the year allot all of the funds available for the same reason. We have to hold some in hand for emergencies and for urgent cases which may arise. We have on our books as full and accurate estimates as possible to secure of what is needed in the shape of work chargeable to this and other appropriations. We could allot the whole appropriation, and more to, and push the work through at the beginning of the year if we had considered it good administration.

MR. SHERLEY. Now, in the memoranda furnished by your office I find indicated some 26 forts where it is proposed to expend this \$20,000. Are there any other fortifications at which there are to be torpedo structures that are not included in this amount?

COL. BURR. That statement, Mr. Chairman, is furnished in accordance with your request as the best information we can give at this time of the proposed application of the \$20,000 contained in the estimates. It includes all of the artillery districts in which there are torpedo structures, and this statement is the allotment of funds, practically, for the present year; that is, it is the allotment of the \$20,000 appropriated in the last act for the fiscal year 1912.

MR. SHERLEY. Did you actually allot all of the appropriations? As I understand it, this is an estimate for the allotments for 1913, and not a statement of allotments for last year.

COL. BURR. As I remember the request of the committee it was for information as to the purposes to which these appropriations were to be applied. We can not foresee all of the needs for the application of funds for the preservation and repair of structures 18 months in advance, nor can we see them a year in advance, and as the best information available to us as to how the department would apply the appropriation for the next fiscal year, we submitted this statement which shows how the appropriation was applied during the current fiscal year. That is the nearest guess that we can make as to the application of the appropriation for 1913, during the year beginning the 1st of next July and extending on 18 months from the present time.

MR. SHERLEY. Then, in point of fact, this is simply the allotment that was made last year, made for 1912?

COL. BURR. That is practically the allotment of funds for the fiscal year 1912.

MR. SHERLEY. Well, now, it shows the allotment of the entire sum. Do you, in point of fact, allot the entire sum among the district officers? I understood you in your earlier testimony to say that some of these funds were held back and only a certain amount allotted to the district officers.

COL. BURR. That is true; but a large amount is allotted to district officers and a certain amount is reserved. And since the committee desired information as to the application of the whole \$20,000, that just includes as closely as possible the application of the \$20,000, using as a basis the amount of funds allotted to each district out of the present appropriation. The amounts, Mr. Chairman, run much the same from year to year, so far as general maintenance is concerned. Now, these torpedo structures involve the rebuilding of wharves, the expense of ordinary repairs and upkeep, etc., and the

amount necessary does not vary greatly from year to year. We allot for that purpose the minimum, reserving the surplus, as far as possible, to meet necessities for extraordinary repairs which occur from time to time. A timber wharf will require no repairs for quite a period, say from 10 to 20 years, but at the end of that time you may have to spend a considerable sum for repairs; that has been the case this year. These torpedo structures, like the batteries themselves, are subject to the usual exposure of the coast, and a good deal of timber is used in some of them.

Mr. SHERLEY. Are they made of wood, iron, or concrete?

Col. BURR. The wharves, as a rule, are made entirely of timber; some of them are concrete piles with timber deck. In southern waters where the teredo is very active we have built, and it is proper to build, wharves on piles which are not subject to the action of the teredo; concrete or steel, for instance.

Mr. SHERLEY. Are the wharves the chief structures embraced in this item? I thought this included the structures that housed the torpedoes.

Col. BURR. They are among the chief structures in point of expense of maintenance; the other structures are the torpedo storehouses, the cable tank houses, and the mine casemates, as they call them there, the operating rooms, the necessary communicating tracks, tramways, and conduits.

Mr. SHERLEY. What is the value of these structures?

Col. BURR. Our figures to the end of the last fiscal year show the first cost as \$1,609,590.28; the ratio of estimates for the year is only 1.37 per cent of the first cost of the structures. In view of the fact that these structures are ordinary buildings, and that the wharves carry a much larger percentage of depreciation than the buildings, the estimate is very moderate.

Mr. SHERLEY. Is not your percentage wrong? Would not that be 2 per cent?

Col. BURR. That is right. This estimate of 1.37 per cent was based on estimates for the fiscal year of \$22,200; it would be 1.24 per cent on the basis of an estimate for \$20,000.

Mr. SHERLEY. How old are most of these structures in point of time? Are most of them rather modern?

Col. BURR. A large majority of them are modern, but in some instances the buildings run back to the older period of torpedo work, and some of the wharves, too, I think. I can not give you the exact date. Mr. Chairman, in that connection I would like to bring before the committee again the question of a change in the wording of the appropriation for this item. A letter from the Secretary of War, I believe, has been forwarded to the committee covering the subject.

Mr. SHERLEY. The recommendation is the addition of the words "and for maintaining channels for access to torpedo wharves."

Col. BURR. Under this item, "For preservation and repair of structures," the situation, shortly, is this: It is sometimes economically desirable to extend a wharf only to a certain point and dredge a channel to it rather than to extend the wharf to water sufficiently deep for the purposes for which it is built. It is a question of economy pure and simple as to which method will be followed. It

also sometimes arises that after a wharf has been built under those or other circumstances the channel shoals and the torpedo planters, for which the wharf was erected, can not reach it at all stages of the tide, and it is desirable that the torpedo planters should be able at all stages of the tide to reach the wharf. The question was submitted to the comptroller as to the applicability of this provision for deepening the channel to and alongside of wharves built for these purposes, and he has held that it is not applicable. We are, therefore, in the position either of having on our hands a structure which is not fully usable for the purpose for which it was built or having to spend a considerably greater sum than dredging would cost to extend the wharf.

Mr. SHERLEY. Are any estimates for these purposes ever made by the engineers in relation to river and harbor work?

Col. BURR. No; they are not river and harbor improvements.

Mr. SHERLEY. Well, they may or may not be, according to the situation at a particular point, is not that true?

Col. BURR. As a general statement, that is true. Projects for the dredging of such a channel as may be necessary for the full utilization of these wharves do not, as a rule, come within the limits of projects which Congress has adopted for the improvement of rivers and harbors. I have in mind a case at Fort Screven, Savannah, Ga. Congress has adopted a project for the improvement of the channel there and that project is in process of execution. The military authorities have built a wharf for torpedo and other purposes at this post, and there is a continual tendency to shoal in the vicinity of the wharf to such an extent that the mine planter can not lie there at all stages of the tide, and the area to be dredged in order to secure sufficient depth of water is entirely outside of the project for the improvement of the channel. Therefore none of the funds appropriated for the Savannah project by Congress are applicable to this dredging around the wharf, which, as I said, lies entirely outside of the limits of such a project. Where the case is such that we can extend a wharf to permanent deep water or to a permanent channel, as included in a river and harbor project, we naturally do so.

Mr. SHERLEY. Assuming that it is desirable that work of this kind should be done through funds furnished in this bill rather than through the river and harbor funds proper, would it not be better for estimates to be submitted for this particular work in order that we might keep plain the maintenance cost of the structures themselves? You are asking that that be merged with moneys for dredging, and those matters may be of sufficient amount to totally destroy any knowledge the committee might have, without segregation each time, as to what your percentage of cost is for the maintenance of the torpedo structures themselves.

Col. BURR. It scarcely seems necessary to make a separate item of this particular item of maintenance, and it does not seem to be practicable, having in mind how river and harbor appropriations are made and the difficulty that would be experienced in securing appropriations in a river and harbor bill for this incidental dredging, which occurs only occasionally in the vicinity of torpedo wharves. In the first place, Mr. Chairman, if such an item was contained in the river and harbor bill, it must go through a period of examination and survey, which would carry it over a couple of years, and since the general

requirements of the river and harbor bill are that improvements in such matters shall be made in the interest of commerce you can see the difficulty that would be experienced in securing an appropriation for this work, as it could not be contended that it was in the interest of commerce. Such dredging has no commercial purpose, and therefore it would not come within the general wording of the river and harbor bill as ordinarily passed. Building and utilizing wharves of this sort would include the cost of maintenance, and it would be easy to report each year how much is expended as a matter of dredging and how much is expended for maintenance of structures, if desired.

Mr. SHERLEY. In the event that money was appropriated for the purpose of dredging, would that dredging be done independently of the river and harbor work or through the same channels and by the use of the same machinery?

Col. BURR. It would be done through the same channels. The district officer who is in charge of all fortification work at any one of these harbors is also charged with certain river and harbor improvements. In most cases river and harbor work involves dredging, and so far as practicable we would undoubtedly use such facilities for doing the work of dredging at these wharves. We bring it up, Mr. Chairman, not as any increase in appropriation, and we do not expect it will involve any increase in our estimates. It is purely an economical question as to whether, in order to make these wharves available, we shall do a little dredging or extend the wharves. The latter usually costs more than a small amount of dredging, in the first cost, and costs us more for maintenance. A request for a similar change in wording is made also with regard to the insular possessions in the preservation and repair of torpedo structures and for the construction of mining casemates. In the construction of some of these structures it became necessary to do some dredging work, for instance, at Honolulu. There the only place available for the erection of a torpedo wharf was at a certain reservation where have been established the customary river and harbor lines, which are much inside of the depth required for torpedo-wharf purposes.

Mr. SHERLEY. Was that at Pearl Harbor?

Col. BURR. That was at Honolulu. In that special case the matter was submitted to the comptroller, and he decided that the funds could be used for dredging an approach to the wharf, on the ground that it was a matter of construction. That is an illustration of the situation that may arise in any instance where we have a torpedo wharf.

CONSTRUCTION OF MINING CASEMATES, ETC.

Mr. SHERLEY. The next item is:

Construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories, to be expended by the Engineer Department.

I notice that you have inserted the same language that was submitted last year and which was stricken out by the committee, the language being "to be expended by the Engineer Department." All of these items appear under the general caption "Engineer Department." What reason is there for emphasizing that this particular item is under the Engineer Department?

Col. BURR. Nothing, except to remove any question of doubt which might arise at any time, since the operation of the torpedo service is not under the Engineer Department as it was in the past at one time.

Mr. SHERLEY. This is only construction and has nothing to do with operation.

Col. BURR. Nothing, except to make it definite, in view of the fact that other departments also handle funds appropriated for the submarine-mine service. If the committee deems that the mere inclusion of this item under the head of Engineer Department is sufficient to bring the expenditure under that department, we are satisfied, if that is made a matter of record.

Mr. SHERLEY. I notice there is no estimate for the item just read; and in order that the notes may be correct, in speaking of the item before—that for preservation and repair of structures—I recited a balance by mistake. That really is the balance that pertains to this particular item, and when I speak of \$38,163.40, that is the balance under the item of mine defense, and I would like to know about it.

Col. BURR. The balances, as of date of November 30, 1911, are as follows: In the hands of district officers unexpended, \$10,855.30; in their hands available, \$8,656.48; unallotted and available, \$38,163.40; total available unallotted, \$46,819.88. The unallotted balance is pledged for work at Fort Terry, at the eastern entrance to Long Island Sound, and elsewhere. The main portion of it is being held for application to these structures in the Narragansett Bay district, the balance for work now under construction, and the funds practically are pledged for work at that point.

Mr. SHERLEY. That completes, Colonel, all of your estimates for continental United States. We will turn now to the estimates for fortifications in the insular possessions.

CONSTRUCTION OF SEACOAST BATTERIES, HAWAIIAN ISLANDS.

On page 20 of the bill you have an item, "For construction of sea-coast batteries, as follows: In the Hawaiian Islands," an estimate of \$222,200 and for the Philippine Islands \$1,036,000. Please take up the first item for the Hawaiian Islands.

Col. BURR. The estimates for the Hawaiian Islands include funds necessary for completion of batteries now under construction and for the construction of two batteries—one for 6-inch guns and the other for 3-inch guns—the construction of which has not yet been commenced. The total amount in the estimates is \$222,200, of which amount \$110,000 is for the completion of batteries now under construction. The balance, \$112,200, is the estimated cost for erecting the 6-inch and 3-inch batteries at Pearl Harbor.

Mr. SHERLEY. What is your unexpended balance at this time for work in the Hawaiian Islands?

Col. BURR. The balances in this case are, as of date of October 31, 1911, allotted and unexpended, \$60,491.32; allotted and available, \$28,729.83; available unallotted, \$9,263.31; total available, \$37,993.14.

Mr. SHERLEY. What is the condition of the work in Pearl Harbor, which is being conducted to make that a naval base? I do not mean the condition of the work being done by the engineers in fortifying it, but I want to know how near the entrance to it has been completed.

Col. BURR. From information received on December 2 from the Bureau of Yards and Docks of the Navy Department it appears that a channel 35 feet deep, with a bottom width of 500 feet, will be completed in February, 1912. I have recently seen in the newspaper an item that one of the larger armored cruisers on the Pacific coast has entered Pearl Harbor. The channel therefore is complete to such an extent as to be navigable in case of necessity.

Mr. SHERLEY. And it is therefore desirable to push forward the coast-defense work at that point?

Col. BURR. It is desirable. The case was pretty fully stated by the Chief of Staff yesterday, and it is desirable to finish the project.

Mr. SHERLEY. The estimate here contemplates a sum sufficient to complete the work now undertaken and also to complete the construction of 6-inch and 3-inch batteries at Pearl Harbor?

Col. BURR. Yes; the 6-inch and 3-inch batteries, whose construction is included in these estimates, are the only batteries of minor caliber provided for the entrance of Pearl Harbor. The work which has so far been done in the defense of Pearl Harbor has been on the heavier batteries, the construction of the secondary batteries having been postponed because they are more easily possible of rapid construction than the heavier batteries; but there are at the present time under construction none of the secondary batteries at the Pearl Harbor entrance.

Mr. SHERLEY. How long does it take to construct these secondary batteries?

Col. BURR. It should not take more than 18 months at the outside from the present time or from the time the appropriation is made. Of course, it is a little difficult to make a definite estimate in the islands on account of the distance and the necessity for securing supplies in this country and the delays which result; but in continental United States both of those batteries, which involve a construction cost of only \$112,200, should be constructed in a year, presuming that there are no unusual difficulties in securing foundations, which cause delay.

Mr. SHERLEY. The next fortification bill will necessarily be enacted into law by March of next year. Will all the money required for the building of these secondary batteries be needed prior to that time?

Col. BURR. We should have it. We feel, as a rule, that we can not commit the Government to expenditures beyond the amount that is appropriated. If only a portion of this is appropriated and that portion is not sufficient for the construction of both batteries, we would naturally restrict ourselves to such work as could be completed with that money. I am making that as a general statement, although in the past, appreciating that funds have been made available in certain appropriations generally worded, we have undertaken work in excess of what could be completed with the funds available.

Mr. SHERLEY. Has not that been usual as to work of this kind, which necessarily runs over a period of time in the insular possessions, simply carrying in the current bill a sum that would be sufficient for that period of time and leaving to the next bill the appropriation of moneys that might be necessary for the remainder of the work?

Col. BURR. That has been the rule, and it is possible that if only a portion of this item were appropriated, leaving a balance for the next bill, we might undertake the work on both batteries.

Mr. SHERLEY. Assuming that policy was followed, what sum would you consider sufficient?

Col. BURR. Sixty or seventy thousand dollars would probably be all that could be expended prior to April 1, 1913, under the conditions named. About one-half of that estimate, Mr. Chairman, consisting of \$110,000 for the completion of existing batteries, we ought to have in this bill. The existing balance of funds on October 31 would not permit of operation beyond, say, the 1st of February, and the work would necessarily have to be suspended, and the longer it is suspended the more disadvantageous it is.

[NOTE.—The total amount of the estimates for this item is \$222,200; of this amount \$110,000 is for completion of batteries now under construction, and this sum should be appropriated without question. The remaining \$112,200 is for the construction of batteries upon which work has not yet been commenced. It is not probable that more than \$60,000 of this \$112,200 could be expended before April 1, 1913, including such liabilities as might necessarily be incurred but not liquidated before that date. To permit, therefore, of reasonable progress in connection with these defenses the total appropriation should not be less than \$170,000, assuming the next appropriation to become available before April 1, 1913.]

Mr. SHERLEY. What does it cost you to lay concrete in building these emplacements?

Col. BURR. I can not say what the cost is in Hawaii, because I have no estimates, but in this country the cost varies anywhere from, say, approximately \$5 a yard upward. Of course, the cost depends to a great extent upon the locality.

Mr. SHERLEY. How does the cost compare with the cost of laying concrete at Panama?

Col. BURR. The two are scarcely comparable, in a way, for the reason that the work at Panama is on such a large scale that the overhead charges involved in providing plant and transportation facilities can be so absorbed as to represent a relatively small percentage of the cost of the work. The transportation problem is also somewhat different from what we would find at other localities. At most forts on the coast which have no convenient means of transportation, the cost naturally runs higher. I have in my hand a table of estimates of the cost for completing the batteries at Honolulu, and the district officer estimates the concrete at \$10 per yard.

Mr. SHERLEY. While I appreciate the necessary difference in cost due to physical conditions, I think it might be of value to know something of the average cost of concrete work done by your department in the States and in the insular possessions as compared with that done at Panama. If you can answer that in the statement without too much trouble, you can do so. I do not mean to have you to go into any labored calculation to supply the data, but the committee would like to know something about the relative cost.

Col. BURR. As I remember the figures coming from Panama in the annual report, their cost, including overhead charges, runs from a fraction under \$6 to something over \$8. But I will add here that the concrete work which has been done in battery construction, which is on a much smaller scale and under somewhat different con-

ditions, is not comparable with the cost at Panama. Do you wish this statement to go into the notes?

Mr. SHERLEY. Yes.

Col. BURR. The size of the work alone affects the price very considerably. The actual bulk of the concrete in any particular structure affects the cost very materially in the various items. For instance, take the one item of cost known as timbering or framing. At Panama, with concrete being installed in very large masses, and with a great deal of similarity in these masses, over considerable distances, they have been able to utilize a standard form for their concrete work, and when a section of wall is completed, they use these forms for other sections of the work. That itself permits of economy in addition to the economy possible from the large mass of concrete placed. And so it goes with all the other items that make up the expense.

[NOTE.—Most recent estimates show estimated costs of concrete varying from \$7 a cubic yard upward. In a 12-inch battery in the United States it was estimated at \$7 and \$8 in new construction, and in extensive repair work of a mortar battery at \$10. In the Hawaiian Islands in the larger batteries the estimate is \$10, and in the Philippine Islands it is \$12 for the normal locations on the coast. At El Fraile, the estimate is \$20, due to some special features of the work and to the exposed location, with increased expense on account of interruption by storm and difficulties in transportation and other elements of construction.]

Mr. SHERLEY. Let me ask you this: In buying cement do you buy it with a view of securing cement that will be used at all places by the Engineering Department, exclusive of Panama, or are the contracts let for cement at each particular place?

Col. BURR. The purchases of cement are made locally for local use, as a rule. In connection with the purchase of cement for the Philippines during the present year, we investigated to see whether we could not purchase under the Panama Canal contract, but after investigating their prices and after investigating the cost of freight from New York to Manila we found that there was no economy in it, and we therefore left it to the district officer in Manila to make the contract for himself. As a rule, it is desirable in the purchase of material that is as bulky as cement to contract locally and take advantage of local facilities for the purchase, particularly where the work is as widely distributed as ours along the length of the coast on both sides of the continent.

CONSTRUCTION OF SEACOAST BATTERIES, PHILIPPINE ISLANDS.

Mr. SHERLEY. Coming now to the estimates in the Philippines, we have a total estimate of \$1,036,000. That is for what work?

Col. BURR. Of that amount \$266,200 is the estimated cost of completing emplacement construction on Corregidor and Corabao Island, in Manila Bay, and Grande Island, in Subig Bay.

Mr. SHERLEY. And the total amount—

Col. BURR. (interposing). And \$770,000 is for continuing the work on El Fraile.

Mr. SHERLEY. Is the first item desired in its entirety owing to the present state of completion of the work in Manila Bay?

Col. BURR. Yes, sir; with some amendments derived from considering the items in detail. I have not analyzed the figures which make

up that total from the point of view of the state of progress of the work. There is some work which is included in that item which can not be completed even if all of the funds were available prior to April 1 next year, when an additional bill goes into effect. There is some work covered by that item so well along that funds to complete it should be available. In the first classification there is one relatively large item for Corregidor which makes a considerable portion of the total, and upon further consideration, if you desire, I will include in my notes a statement of how much of this could be carried until the appropriation is available on the 1st of April next year.

Mr. SHERLEY. I would be glad if you would do so.

Now, as to the item of \$770,000 for partially completing the work on El Fraile. What do you estimate the work on El Fraile will amount to, exclusive of the sum already appropriated?

Col. BURR. I was unable to give that data last year in the hearings before the committee, and having no figures at all that I considered of any value, we gave no estimates at all of the cost of completion in addition to the sums already appropriated at that time. Since last year, however, the plans for the work have advanced to such a stage that I have been able to make estimates as reliable as any that can be made for a work of the character and in the location of this particular one. These estimates indicate that the amount necessary for the completion of the engineering work at El Fraile is \$1,540,000.

Mr. SHERLEY. That is exclusive of the amount heretofore appropriated?

Col. BURR. Yes, sir; in addition to the amounts heretofore appropriated. It is the amount which is in addition to and above the original estimate of the department for the engineering work on this battery. There have been up to the present time no deficiency estimates submitted for El Fraile, no deficiency appropriation, and no appropriations in excess of the department's original estimate of the cost of the work.

Mr. SHERLEY. Do I understand you to say that it is now estimated that this sum—

Col. BURR (interposing). \$1,540,000.

Mr. SHERLEY (continuing). Is in excess of what it was originally contemplated that the work might cost at El Fraile?

Col. BURR. It is in excess of the original estimate of the cost of the Engineer Department's work.

Mr. SHERLEY. Do you know whether similar excesses will appear in the work of other departments in the fortifications bill?

Col. BURR. We think not. We have considered the matter with the other department concerned, the Ordnance Department, and they feel that they will probably say when they come before the committee that their appropriations are sufficient to complete their work at El Fraile.

Mr. SHERLEY. Is this due to a change of plan or a better ascertainment of the cost of carrying out the original plan?

Col. BURR. In a sense it is partially due to some change in the original project rather than in the plans. The original project included the installation of 12-inch guns, and it was subsequently decided to use 14-inch guns. That has probably involved some increase in the cost, but we do not lay any particular stress on that. The main

increase of cost over the original estimate is undoubtedly due to an underestimate in the first instance, and to the difficulties of the work from all points of view—that is, to difficulties of construction in that locality, and to difficulties in designing a work that will be sufficient for the purpose.

Mr. SHERLEY. What was the original estimate as to engineering cost at El Fraile?

Col. BURR. All the cost of engineering work which was covered by this additional estimate, \$1,200,000.

Mr. SHERLEY. The estimates were less than 50 per cent of the cost.

Col. BURR. Yes, sir.

Mr. SHERLEY. That was a pretty bad miss, Colonel.

Col. BURR. I agree with you; but there was one special reason which operated in increasing the cost of that work. It was assumed at that time that a concrete wall 25 feet thick would stop a high-power naval projectile, but we know now that it will not, and we have had to get a more elaborate and expensive type of construction to provide for that condition.

Mr. SHERLEY. Then, the increase in cost is not due so much to a mistake in estimating the cost of laying concrete as to an underestimate of the quantity required to make the walls sufficient to resist the high-power naval projectile?

Col. BURR. Frankly, I can not say that that is strictly so. The cost of the work in the first instance was estimated in good faith, but with insufficient information. Personally, under the facts and circumstances, I would not have submitted an estimate as low as that, because it does not seem to me, considering it after the fact, that the work could have been done even on the basis then contemplated for the amount of that estimate. Of course, different engineers look at problems of that sort differently, and the statement I am making is not to be taken as at all a criticism upon the officer who made the original estimate.

Mr. SHERLEY. Before they prepared it, they had had previous experience in laying concrete in that immediate vicinity, had they not?

Col. BURR. Yes, sir; but not under conditions such as exist at El Fraile, and we had no plans for a battery of this type at that time. It is unique in our experience, and probably in certain respects it is unique in the experience of any other country. The original estimate was a broad guess, pure and simple.

Mr. SHERLEY. Do you think that the present estimate is going to remain an accurate estimate as to the cost?

Col. BURR. I can only answer by stating that one of the first things that came up to trouble me considerably, when I took over my present duty, was with regard to estimates in the Philippines. Distance and other conditions have made it very difficult for us to estimate accurately and keep track of the estimates, but it has been impressed upon the local officers with as much force as we can do so the necessity for extreme care and accuracy with regard to their estimates, and particularly with regard to furnishing us estimates upon which we could come before the committee and rely upon as much as any estimates can be. To answer a little more categorically, after this explanation, I can only say that to the best of my knowledge and belief the cost of the work should not exceed the amount I have given you to-day. In fact, I could have given you some estimate last year,

but I would not do so in the absence of anything I could consider at all reliable.

Mr. SHERLEY. You got \$1,169,000, and it was thought that that would about complete the work there, was it not?

Col. BURR. That was thought probably sufficient to complete the work excepting El Fraile, which was not included in that amount. There have, however, come up some additional items since in connection with the work at Corabao and Corregidor. The batteries at Caballo have just been commenced within recent months, and work has not progressed far enough for us to be able to say definitely whether the sums that have been set aside for them will be sufficient to complete them. We think they are, but we can not guarantee it.

Mr. SHERLEY. Referring to this item of \$770,000, under the estimate for work on El Fraile under the new increased estimate, how much of that sum do you think would be required prior to the time when sums might become available in the bill next year?

Col. BURR. On October 31, 1911, the total available balance for battery construction in the Philippines was \$895,322.93. Our expenditures in the Philippines for the fiscal year 1911 were \$608,000, approximately. So far as we can use that for a guide in estimating the expenditures from October 1, 1911, to April 1, 1913, these expenditures would approximate, say, \$1,000,000, but it is probable that the work on El Fraile that is most expensive will have progressed considerably, although all should progress at an increasing rate, so far as expenditure goes, from now on. Up to the present time the work has been largely preliminary—that is, in the preparation of foundations, and the walls have just now started. I can not say just what funds will be sufficient to carry us until the 1st of April, 1913, but we will make an estimate to the best of our judgment and submit it in the notes. It is possible to say, however, that this estimate herein included is for the fiscal year. All of it will not be needed if additional funds are available three months before the end of the fiscal year.

Mr. SHERLEY. I did not catch your statement as to the amount of available funds now on hand for engineering work in the Philippines.

Col. BURR. The total amount available for battery construction in the Philippines was stated to be \$895,322.93 on October 31 last.

Mr. SHERLEY. I understood you to say that you would put in your notes a statement of how much of this \$770,000 you thought would be required to be carried in this bill in order not to interfere with the progress of the work.

Col. BURR. Yes, sir; and I will reduce it to the minimum that we can estimate to be sufficient to carry the work to April 1, 1913, and not delay construction. The total estimate for El Fraile was based on completing the work by the end of the fiscal year 1914—2½ years from the present time. Therefore the balance necessary was divided and half asked for in the present estimate, and it was expected that the remaining half would be included in the estimates for next year.

[NOTE.—The available unencumbered balance of appropriations applicable to battery construction in the Philippine Islands on Oct. 31, 1911, was \$895,322.93, of which sum \$340,000, more or less, is the balance of funds appropriated and held for use at El Fraile, leaving a balance of \$545,000, more or less, applicable

to all other battery construction. So far as can be determined at this time and at this distance, the following sums should be available to carry on the work to Apr. 1, 1912, and to avoid loss of time and money that would result from suspension of work, with disorganization of forces, viz:

For El Fraile.....	\$950,000
For other localities.....	750,000
Total.....	1,700,000

The sum of \$800,000 should, therefore, be carried in the current bill to avoid possibility of suspension of work. The balance of this year's estimates should be added to the estimates for next year, and will increase them by that amount, viz, \$236,200. Should this reduction be made in the appropriation, the Chief of Engineers may find it necessary, under some contingencies that may arise, to apply available funds to works that progress most rapidly with some departure from the application stated in this hearing, although without departure from the authority contained in the appropriation item.]

INSTALLATION AND REPLACEMENT OF ELECTRIC LIGHT AND POWER PLANT IN THE HAWAIIAN ISLANDS.

Mr. SHERLEY. The next item is for installation and replacement of electric light and power plant at the defenses in the Hawaiian Island, \$25,000. What is the status of the balance on that appropriation?

Col. BURR. The balance is as follows: October 31, 1911, allotted and unexpended, \$551.15; available allotted, \$473.05; available, unallotted, \$4,910.05, making the total available, \$11,873.44.

Mr. SHERLEY. This estimate you have recommended for installation and replacement of electric light and power plant. These power plants are nearly new, are they not?

Col. BURR. Yes, sir; but it simply makes the items for the Hawaiian Islands correspond in wording to the same item in the United States, that change having been made by the committee last year in the item for electric light and power plants in the United States with a view to restricting and limiting the application of the appropriation entirely to installation and to removing from it any expenditures for repairs and upkeep.

Mr. SHERLEY. I understand, but this item heretofore for installation has been simply for installation. Now, the plants there are so very recent that it is hardly conceivable that you could have any occasion for replacement.

Col. BURR. We have no replacements in mind, and do not expect to have for some years.

Mr. SHERLEY. There is no present need, then, for putting in that language.

Col. BURR. No, sir; except that it appeared desirable, as, for instance, in some other items in the same bill, to make the wording of similar items correspond, if not embracing things of a different character. There may be no present necessity, but some time later it might possibly come up when the change will be desirable; but at the present time we have no replacements in prospect.

Mr. SHERLEY. This estimate is supposed to complete the entire work in the Hawaiian Islands for electric-light and power plants?

Col. BURR. The estimate is supposed to be sufficient, as nearly as we can determine, to complete the electrical-power installation in the batteries and the reserve equipment. We are not estimating on

any central power-plant equipment, but are estimating and depending entirely upon the reserve equipment and the gasoline sets installed in the batteries themselves.

Mr. SHERLEY. Do you mean that the reserve equipment is the only equipment you contemplate having?

Col. BURR. That is all at Honolulu and Pearl Harbor.

Mr. SHERLEY. And you have no central power plant?

Col. BURR. There is none contemplated at the present time. In fact, as I stated yesterday, these so-called reserve sets are proving so satisfactory that we are finding it better and more efficient, as well as a matter of economy, to use them entirely for battery-power purposes, installing, if desirable, an additional set as a reserve. In other words, in a 14-inch battery, if two sets are sufficient to furnish the power for the battery, we install a reserve and make our reserve in that way an additional set.

ELECTRIC-LIGHT AND POWER PLANTS, PHILIPPINE ISLANDS.

Mr. SHERLEY. You have estimated for the Philippines, under this item, \$21,614. What is the state of the balance there?

Col. BURR. On October 31, 1911, the balance allotted and unexpended was \$5,108.24; available and allotted, \$3,213.91, and available unallotted, \$237,287.91, the total available being \$240,501.82.

Mr. SHERLEY. In view of the fact that you now have available over \$200,000, don't you think you could get along without this estimate of \$21,614?

Col. BURR. We might; and I will analyze the estimate from the point of view of getting along without any additional funds now.

Mr. SHERLEY. Are you not in a better fix there than anywhere else in the country in the way of available funds on hand?

Col. BURR. Yes, sir, and no, sir. Yes, sir, so far as present plans show, and no so far as the work in the future is concerned. We are submitting and discussing estimates that will carry us until 18 months from now. It is just possible that some of it may be omitted from the present bill if it comes in the bill which will make funds available for us on the 1st of April, 1913. But we expect that practically all the batteries in the Philippines will be completed by the end of the fiscal year 1914, and, therefore, the funds for all purposes necessary to the completion of the batteries should be available so that the work can be completed by the end of the fiscal year 1914. That is the case with all of the batteries except El Fraile, but none of this money is included in the work to be done at El Fraile. It covers the electric-light installation at Caballo and Corregidor. The main part of the existing fund is mortgaged for the central power plant on Corregidor Island.

Mr. SHERLEY. Then El Fraile was not included in the broad estimates at all, was it?

Col. BURR. No, sir.

Mr. SHERLEY. Then, eliminating it from consideration in this item, the present amount is sufficient to complete all of your light and power plants for the existing batteries in the Philippines?

Col. BURR. Yes, sir.

Mr. SHERLEY. Now, these batteries certainly can not be so far completed before money is available in the new bill as to make the instal-

lation of all the lighting and power plants necessary prior to April of next year?

Col. BURR. All of the batteries in Manila Bay are completed or under construction, including El Fraile. The batteries on Carabao, which include heavy guns, are from 90 to 95 per cent completed, and we should complete within the next 15 months the works at Caballo which have recently been begun. The Carabao batteries will be completed within 15 months. This includes no funds for El Fraile, the electric-light and power plant for El Fraile being included in the cost of the work itself. However, if on further consideration of the estimates under that title it appears that we can do without the estimate included in the bill this year, we will insert a statement to that effect, if it is desired.

Mr. SHERLEY. We will be glad to have you do so.

[NOTE (by Col. Burr).—This amount, \$21,614, may be omitted from this bill, but should appear in the next bill.]

SEARCHLIGHTS, HAWAIIAN ISLANDS.

Mr. SHERLEY. The next item is "For purchase and installation of searchlights in the Hawaiian Islands, \$10,800." What is the condition of that balance?

Col. BURR. The condition of the balance is: Searchlights, Hawaiian Islands, October 31, 1911, allotted and unexpended, \$10,087.80; allotted, available, \$9,574.42; unallotted, available, \$75,159.10; the total being \$84,733.52.

Mr. SHERLEY. What is this \$10,080 expected to be expended for?

Col. BURR. For the installation of searchlights at Pearl Harbor and Honolulu. The present situation with regard to the work is as follows: Seven 60-inch lights, with generating sets, for the Hawaiian Islands have been received and one 36-inch light has been received by transfer from the United States. But two of the 60-inch lights have been installed, and the installation is considered at this time temporary, so far as the light itself is concerned, the installation of the power plant being considered permanent. The 36-inch light has been installed. Therefore it appears that while nearly all of the lights have been ordered and have been delivered, the installation has only progressed to a moderate extent, and the balance of the funds now on hand will be devoted to the installation and to the purchase of the material necessary in connection with installation. My recollection is—and if it is not correct I will correct it—that all but one of the lights have been purchased or have been ordered, so that the work remaining to be done is installation, for which these funds are desired.

Mr. SHERLEY. Is this amount estimated to be all that is necessary to complete entirely the searchlight items in the Hawaiian Islands?

Col. BURR. Yes, sir; according to the scheme adopted for the searchlights.

Mr. SHERLEY. Of course, the condition of the defenses at Pearl Harbor is that they are yet very far from completion.

Col. BURR. Not very far. The heavy batteries are well along toward completion. As a matter of dollars and cents, seven-eighths of the money has been expended.

Mr. SHERLEY. But taking the physical condition of the work—can they be so far completed as to need searchlights for them this year?

Col. BURR. No, sir; but the armament is mounted in the 12-inch battery at Pearl Harbor.

Mr. SHERLEY. And they are also supplied with searchlights?

Col. BURR. No, sir.

Mr. SHERLEY. But money has been provided for them?

Col. BURR. Yes, sir; we have the money for them, but we have not the money to complete the project. As the balance shows, we have a large percentage of the money necessary.

Mr. SHERLEY. But a part of the searchlight equipment is for the secondary battery, which can not be completed this year. Is not that true?

Col. BURR. No, sir; the searchlight scheme at Pearl Harbor involves practically only one set of searchlights. The batteries, including the heavy guns and mortars and the secondary armament, are located on one reservation, which is a relatively long strip of beach, and the searchlight project for the service of these batteries involves the installation of merely one set of searchlights, which will serve for the entire group of batteries.

SEARCHLIGHTS, PHILIPPINE ISLANDS.

Mr. SHERLEY. In the Philippine Islands, for the same item, you have estimated \$20,600.

Col. BURR. That is the balance unappropriated of the estimate for searchlights in Manila Bay and Subig Bay. We have on hand as of November 30, 1911, the following balance: Allotted unexpended, \$91,538.12; allotted available, \$89,117.21; unallotted available, \$51,518.57, with a total of \$140,636.20. The lights for the Philippines are all ordered, and the balance is wanted for completion. This is necessary for installation. The installation has progressed only to a limited extent. In some places like Caballo it has not been undertaken at all, but the remaining balance is desired to complete the work and is estimated to be sufficient to complete it.

Mr. SHERLEY. Referring to the El Fraile project, do you expect to have any estimates for light again outside of this?

Col. BURR. We do not expect any additional estimates for El Fraile for any purpose under the heading under which the appropriation for El Fraile has been made. This estimate for searchlight installation included lights for El Fraile; that is my recollection, but it includes merely the lights, the power for them being furnished from the central plant.

PROTECTION, PRESERVATION, AND REPAIR OF FORTIFICATIONS, HAWAIIAN ISLANDS.

Mr. SHERLEY. The next item is for protection, preservation, and repair of fortifications in the Hawaiian Islands, \$1,500. This is the first time you have begun to ask for maintenance for the Hawaiian batteries, is it not?

Col. BURR. Yes, sir; but a similar item for the Philippines has been carried for two years past. The batteries are progressing toward completion, and the fund for construction ceases to be applicable, strictly, after the batteries are turned over to the troops. Some funds are necessary for maintenance and preservation. Very little will be required, and we are asking for very little.

Mr. SHERLEY. This estimate represents what percentage of the cost?

Col. BURR. I can give it as a matter of total expenditure. The funds applied to battery construction in the Hawaiian Islands, including the act of March 4, 1911, amount to \$1,347,200. That is practically all expended, so that all we are asking for, if I figure correctly, is one-tenth of 1 per cent.

Mr. SHERLEY. If we can feel assured that you will be satisfied with that percentage as the years go on, we will probably not complain.

PROTECTION, PRESERVATION, AND REPAIR OF FORTIFICATIONS, PHILIPPINE ISLANDS.

Mr. SHERLEY. The next item is in the Philippine Islands, \$14,000; the appropriations in 1911 and 1912 were \$7,000. How have you gotten along with your appropriations heretofore?

Col. BURR. Having only \$7,000, of course we could only spend \$7,000; and if there was work to be done which could not be accomplished with that amount, it would probably have to go over.

Mr. SHERLEY. What is the fact? Has there been work enough?

Col. BURR. That I can not say; we have had no reports to the contrary.

Mr. SHERLEY. So far as you know, you have gotten along on \$7,000?

Col. BURR. Yes, sir. We will allot the entire \$7,000 and leave it to the district officer to work out his own salvation.

Mr. SHERLEY. How much of a balance have you there now?

Col. BURR. October 31, allotted, unexpended, \$2,416.55; allotted and available, \$2,352.97; available, unallotted, \$2,877; total available, \$5,229.97.

Mr. SHERLEY. You seem to have gotten along very well on \$7,000.

Col. BURR. Having no more than \$7,000, we could not spend more, Mr. Chairman. The situation practically amounts to this: That the batteries in the first few years require comparatively little work, but as time progresses the needs increase in the shape of caring for slopes, repainting, etc., and if they can only get \$7,000, that is all they can spend.

Mr. GOOD. What is the value of the property there?

Col. BURR. The total appropriations to March 4, 1911, for application in the Philippines, amounted to \$5,641,837.89; the value of property, of course, is that amount less the unexpended balance on hand, which is something like a million dollars, so that the batteries now constructed represent, practically, \$4,600,000.

Mr. SHERLEY. So the oldest work there is only a very few years old and most of it is absolutely modern?

Col. BURR. That is true; but these funds are applied also to maintenance and preservation of fire-control structures, and paint

does not last very many years, particularly in the Tropics; so that some repairs become necessary within a few years from completion, and it is only the portions which require no attention and which are permanent that can be left out of consideration in the first two or three years of the batteries. Concrete, for instance, of which these modern batteries are constructed, in the Tropics where there is no trouble from frost, requires no repairs for the first few years, but there are other things, such as painting and things of that sort, that will require attention at the end of two years.

[NOTE.—Since this hearing an allotment of \$1,500 has been made for the repair of earth slopes damaged by heavy rains.]

PRESERVATION AND REPAIR OF STRUCTURES ERECTED FOR TORPEDO DEFENSE, HAWAIIAN ISLANDS.

Mr. SHERLEY. The next item is:

For preservation and repair of structures erected for torpedo defense at the following localities: In the Hawaiian Islands, \$500.

In the Hawaiian Islands for the first time you are asking for \$500.

Col. BURR. Yes; this is the first estimate in which that item has occurred. The torpedo structures have been building during the last year, and a small amount is necessary for repair and upkeep.

Mr. SHERLEY. The first year?

Col. BURR. No; this \$500 does not become available until next June, and it is necessary to carry us a year and a half from the present time. Some of these structures are in use and occupied.

PRESERVATION AND REPAIR OF STRUCTURES FOR TORPEDO DEFENSE, PHILIPPINE ISLANDS.

Mr. SHERLEY. Now, in the Philippines you ask for \$1,000, and for the past two years you have had \$1,000.

Col. BURR. The balances October 31, 1911, are, allotted, unexpended, \$384.12; available, allotted, \$384.12; available, unallotted, \$683; total available, \$1,067.12. The greater part of that balance is still available at the date given.

Mr. SHERLEY. You really did not need the \$1,000?

Col. BURR. They have not used it.

Mr. SHERLEY. That is pretty good evidence that you have not needed it, is it not?

Col. BURR. Well, it has not been urgent, of course, or it would have been used; but that balance must carry them to the end of the fiscal year, June 30, and may or not all be used by that time.

TOOLS, ELECTRICAL AND OTHER SUPPLIES, PHILIPPINE AND HAWAIIAN ISLANDS.

Mr. SHERLEY. The next item is:

For tools, electrical and other supplies and appliances, to be furnished by the Engineer Department for the use of the troops for maintaining and operating guns and mortar batteries: In the Hawaiian Islands, \$1,000.

Last year you had \$1,000. How did that run you?

Col. BURR. The balances for supplies, Hawaiian Islands, October 31, 1911, are as follows: Allotted and unexpended, \$634.58; available, allotted, the same amount; total available, the same amount.

Mr. SHERLEY. Unallotted, how much?

Col. BURR. Unallotted, nothing.

Mr. SHERLEY. I have a statement here that you have, including the Philippines, a balance available for expenditure of \$4,259.46.

Col. BURR. What item is that?

Mr. SHERLEY. This item for tools, electrical and other supplies and appliances. You have had, all told, \$6,000, and I find you have here an available balance of \$4,259.46.

Col. BURR. That was on June 30.

Mr. SHERLEY. You seem to have cut in pretty deeply since June 30 on all of these balances, and evidently it is a mistake to have the balances made up until it is time to consider the bill.

Col. BURR. The figures that you have read cover both the Hawaiian Islands and the Philippines on that item?

Mr. SHERLEY. Yes.

Col. BURR. While the figures I have given you, \$634.58, cover only the Hawaiian Islands, the balances for the Philippine Islands, for the same purpose and of the same date, are allotted, unexpended, \$1,405.37; available, allotted, \$1,051.63; available, unallotted, \$1,461.20; total available, \$2,512.83. That figure, taken with the available balance in the Hawaiian Islands, makes a total of \$3,147.41, so that the expenditures since June 30, the date of the other statement, have reduced the balance to that amount, but the mere matter of expenditures is not itself indicative as to what has occurred since June 30. These expenditures may have included liabilities incurred months before, particularly in the case of supplies shipped out from this country.

Mr. SHERLEY. In point of fact, you have had, since the beginning of this item, which was first carried in the appropriation act of 1911, \$6,000, and you have only spent a little less than two-thirds of it, yet you have an estimate now for \$1,000 in the Hawaiian Islands and \$5,000 in the Philippines, \$6,000 for the next year. Do you not think that is excessive?

Col. BURR. No, sir. The facts are that, so far as the Hawaiian Islands go, we have had \$1,000 available for this purpose since the last act. We have spent one-third of it and the balance will carry through until the end of the fiscal year. In the Philippines we have had two appropriations of \$2,500 each, and 50 per cent of those amounts, which were intended to cover two years, have approximately, been expended.

Mr. SHERLEY. Well, on that showing, the estimates have been twice what you have needed in the past?

Col. BURR. No. The first appropriation was only available the 23d of June, 1910, which is 18 months ago, and it was not available for use in the Philippines until three or four months later. Now, I do not know whether the committee, in view of this strict analysis of balances which happen to appear on our books at certain times, desires to encourage the department, in order to make a good showing, to spend balances right up to the—

Mr. SHERLEY. We do not desire to encourage any unnecessary expenditure at all, but it is highly desirable that this committee should

know the balances in order that it may determine for itself somewhat how much moneys are needed, and we do not mean to encourage in the slightest degree any disposition on the part of the department to spend everything so as to show an absence of balances.

Col. BURR. The estimates submitted by the Engineer Department for fortification purposes are low; they are much below the amount which we could economically and effectively use in connection with fortifications.

Mr. SHERLEY. In point of fact, we want to so encourage balances as to take advantage of them to give you additional opportunities to show economies.

Col. BURR. But the funds appropriated are so small that we have to husband them with care, and, as a matter of fact, we must carry over some balance until we see that additional funds are going to be available. That necessarily means we must carry funds along to the end of the year in order that we may have funds to meet emergencies that may arise. There is no endeavor made to apply or expend funds otherwise than seems, in our judgment, to the best interests of the service, irrespective of what these balances may show as reported at these hearings.

CONSTRUCTION OF MINING CASEMATES, PHILIPPINE ISLANDS.

Mr. SHERLEY. The next item is on page 24:

For construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories at the defenses of the Philippine Islands.

There is an estimate submitted of \$67,000.

Col. BURR. The estimate submitted is \$67,000, and is the amount necessary to provide certain additional structures in connection with the submarine-mine defense of Manila Bay, in accordance with the latest adopted projects of the Coast Artillery for that defense.

Mr. SHERLEY. What are your balances now?

Col. BURR. In the Philippine Islands the balances for torpedo structures, of date of October 31, 1911, were: Allotted, unexpended, \$77,392.07; allotted and available, \$76,905.67; unallotted, nothing; total available, \$76,905.67.

Mr. SHERLEY. That which has been allotted, however, has not been actually spent?

Col. BURR. No; but it has been apportioned to the district officer for the execution of certain specified work.

The financial situation with regard to this particular project is as follows: The project which has now been adopted for this work requires for its completion \$139,700, which, reduced by the balance available of \$73,000 at the time these estimates were made up, leaves requirements amounting to \$66,700; the balance required to complete is estimated, in round figures, at \$67,000.

Mr. SHERLEY. Nothing was included for operation, preservation, and care?

Col. BURR. Not in this appropriation.

Mr. SHERLEY. Then why do you ask for this language?

Col. BURR. The word "care" relates to the submarine mines for which these structures are erected.

Mr. SHERLEY. I understand; but if all of the money you are asking for—\$67,000—is to be used for construction purposes, why put in language authorizing its expenditure for care of the mines?

Col. BURR. I do not read the item as authorizing any expenditure for the care of the structures.

Mr. SHERLEY. The word "necessary" qualifies all that goes after it, and I overlooked that.

Col. BURR. Yes; care does not relate to the buildings.

Mr. SHERLEY. That, I believe, Colonel, completes the items in which the engineers are interested. Is there anything that we have overlooked that you would like to bring to the attention of the committee?

APPROPRIATIONS TO BE IMMEDIATELY AVAILABLE.

(See also p. 129.)

Col. BURR. On page 28 there is a suggested item, as follows: "Appropriations herein and hereafter made for fortifications and other works of defense shall be immediately available and shall remain available until expended." Last year, if I remember correctly, it was held that some of these items were not available until the beginning of the fiscal year, and it particularly was the case in the item of appropriation for the defense of the Panama Canal.

Mr. SHERLEY. That is carried, of course, in a different bill?

Col. BURR. But the principle is the same—that is, the principle of interpretation by the comptroller was the same—and that was in the bill in which the funds were presumably available from the date of its approval.

Mr. SHERLEY. Has there ever been any ruling as to appropriations carried in the fortification bill proper; that is, that they were not immediately available?

Col. BURR. Yes; I think so.

Mr. SHERLEY. I see the note says: "Under a recent ruling of the Treasury Department, the funds appropriated in the fortification appropriation act of March 4, 1911, were not available for expenditure until July 1, 1911."

Col. BURR. Yes; that was the case.

Mr. SHERLEY. The committee will be glad to consider this recommendation.

MONDAY, JANUARY 15, 1912.

ARMAMENT OF FORTIFICATIONS.

STATEMENT OF BRIG. GEN. WILLIAM CROZIER, CHIEF OF ORDNANCE ACCOMPANIED BY MAJ. J. H. RICE AND MAJ. E. P. O'HERN, ASSISTANTS, UNITED STATES ARMY.

PURCHASE, MANUFACTURE, AND TEST OF MOUNTAIN, FIELD, AND SIEGE CANNON.

Mr. SHERLEY. Your first item, I believe, is on page 12 of the bill:

For the purchase, manufacture, and test of mountain, field, and siege cannon, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals.

You have an estimate for 1913 of \$1,002,000. Before going into the estimate itself, will you briefly explain just the character of the ordnance that is meant by mountain, field, and siege cannon, in order that the record may show?

Gen. CROZIER. That is a class of material which we now more generally designate as mobile artillery. It is sometimes difficult to draw an exact line between different classes of artillery, because as the arts progress we find ourselves able to use things for different purposes than those for which they have been used heretofore, and therefore the old designations become less exact. There is an illustration of that in this case. Here we speak of mountain, field, and siege cannon, and when we first commenced to use these expressions in these estimates we intended them to mean mobile artillery; that is, artillery such as would accompany an army in the field. Now, however, with the increase in the facilities for railroad building, building temporary roads, for using traction engines, etc., there can be used, and are used, for siege work artillery of a kind which had heretofore been considered simply fixed artillery, artillery of place, seacoast artillery; so that in that sense this item does not include all the classes of such artillery that might be used in sieges, but it is intended to cover, as I said a moment ago, only the mobile artillery on wheels, drawn usually by horses, although it may be drawn by traction engines which accompany the army in the field.

Mr. SHERLEY. There are three kinds undertaken to be described, mountain, field, and siege cannon. If that division is still in any sense applicable, will you indicate the difference between those different pieces?

Gen. CROZIER. Mountain artillery is sometimes called pack artillery; that is to say, it includes a class of gun and what goes with the gun, which is light enough to be carried, by a separation of the component parts, on the backs of pack animals, and is for use in those countries where wheeled vehicles are not practicable. Field artillery generally applies to that class accompanying an army in the field when it is engaged in operations against another army, against a similar force, and siege artillery is that which is used in laying siege to a fortified place, and does not have to be quite so mobile as the others; and it runs into a class that has to be moved on railways and by mechanical appliances instead of by traction engines or by horses.

Mr. SHERLEY. What is the caliber of these different guns in each of these classes which you are at present manufacturing and expect to manufacture?

Gen. CROZIER. We have only one mountain gun; that is a 3-inch gun, which fires a projectile weighing 15 pounds, with a velocity of 900 feet per second. Now, we include all the rest which we intend to have covered by this item in the term "field artillery," and of that class of artillery the smallest caliber is 3 inches; that is what we might call the standard gun. It is the gun which in the greatest quantity should be manufactured in preparation for war and in the greatest number would accompany an army in the field. It is designed so that the gun carriage and one limber chest full of ammunition shall be a suitable load for a six-horse team. It is always a fight between power and weight. There is always a desire to have the gun have a little more power and have it carry more ammunition with it and

at the same time keep the weight down, so it shall not be too much of a load for six horses to move about at the same rate as the remainder of the army in the field. That same gun is used to accompany a mixed army of all arms of the service and also to accompany a cavalry expedition. When that is done all the canoneers are mounted on horses and the battery is intended for more rapid movement; we meet the necessity for greater mobility by either putting on a couple more horses or, preferably, by decreasing the number of rounds of ammunition carried in the ammunition chest and decreasing the corresponding number carried in the chest on the caisson, so that the sacrifice will be of ammunition supply to meet the necessity for increased mobility.

Now, the next gun that we have, more of which will not be used than we now have, is the gun of 3.8-inch caliber. But before describing that gun I will mention another class of piece of the same mobility as this 3-inch gun, which is the 3.8-inch howitzer. The howitzer is a shorter and lighter piece than the gun of corresponding mobility, designed to throw a heavier projectile than such a gun, but necessarily with a lower velocity, because in order to preserve the same mobility the weight must not go up, and it would be impossible to throw a heavier projectile with the same velocity without increasing the weight of the gun.

Mr. SHERLEY. It also throws at a higher angle?

Gen. CROZIER. It must necessarily do that in order to attain the same range with the lower velocity; and it has an advantage in that it is useful for searching out troops behind trenches, which can be accomplished through the greater angle of fall of the projectile. The drop would be more closely behind a parapet of any kind than with a projectile from a gun of higher velocity. Now, a 3.8 howitzer is designed to be of the same mobility as a 3-inch gun and to require the same number of horses to pull it around with the same facility. Then, there is the 3.8 gun which I mentioned to you. It fires a projectile of 30 pounds weight, namely, double the weight for the gun of corresponding mobility, but at 900 feet velocity instead of 1,700 feet. So there you will see the relation between the two—a gun and a howitzer of equal mobility—the gun firing a projectile of a certain weight with a certain velocity and the howitzer firing a projectile of twice the weight with less velocity. That relation runs all the way through our scheme of mobile artillery, which we have endeavored to arrange with some exactness.

The next gun in caliber is the 3.8 inch, the same as the howitzer of equal mobility with the 3-inch gun, and firing the same weight as that howitzer, but firing it with the velocity of the 3-inch gun. That means a more powerful and heavier piece of artillery. This 3.8-inch gun, therefore, requires either more horses or a greater weight per horse with the same number of horses in the team. We have a couple of batteries of that, but it is not considered a particularly useful gun, and we probably will not make any more. That is the present plan, at least. Corresponding with that gun is a 4.7 howitzer of equal mobility. This fires a projectile of 60 pounds weight with a velocity of 900 feet a second, and is so designed that it will give a load of 800 pounds per horse behind a six-horse team. The next gun in caliber is the 4.7 gun, of which we expect to manufacture a considerable number. That gun gives a load of 1,000

pounds per horse for an eight-horse team; it fires a projectile weighing 60 pounds with a velocity of 1,700 feet per second. The corresponding howitzer is a 6-inch howitzer of equal mobility. It fires a projectile of 120 pounds with a velocity of 900 feet per second.

Mr. SHERLEY. Do you expect to manufacture any of those?

Gen. CROZIER. Yes, sir; we are doing so now. The next piece which we have projected is a 7.6-inch howitzer, which would fire a projectile of 240 pounds, with a velocity of 900 feet a second, and would constitute such a load that it would have to either be divided up and carried separately from its carriage on a separate vehicle or have to be moved by some kind of mechanical process like a traction engine. You will observe that there are one or two rather simple rules running through this series of guns and howitzers. The smallest and lightest of them all is the 3-inch mountain howitzer, which is really what it ought to be called, and to which there is no corresponding gun. The howitzers then run up, 3 inch, 3.8 inch, 4.7 inch, 6 inch, and 7.6 inch. Each one of these pieces fires its projectile with the same velocity, namely, 900 feet per second, and each successive one fires a projectile of double the weight of the next lighter, the projectiles running up from 15 pounds to 30 pounds, to 60 pounds, to 120 pounds, and 240 pounds. That is the rule in regard to the howitzers. Now, the guns, commencing with the 3-inch gun, fire projectiles of weights half those of the corresponding howitzers; it has a caliber the same as that of the howitzer of the next greater degree of mobility, and fires a projectile with a velocity of 1,700 feet. The gun projectiles also increase in a geometrical progression, with a ratio of two—that is, each projectile is double the weight of that of the next lower class of gun.

Mr. SHERLEY. With the velocity remaining the same?

Gen. CROZIER. Yes, sir. The projectiles run 15 pounds, 30 pounds, and 60 pounds, which is as high as we go in the guns proper. There is the same velocity for all the guns, 1,700 feet, and the same velocity for all the howitzers, 900 feet; each gun is of the next lower caliber as compared with the howitzer of corresponding mobility, and each projectile increases in weight by doubling as you go up in the series.

Mr. SHERLEY. How many of each class of these guns are now actually built, and how many are authorized?

Gen. CROZIER. Instead of giving the number that are now actually built, which I think I can do, perhaps at first I had better give you the number provided for by appropriations and which are either built or building, and I will give it to you in batteries. The number of 3-inch mountain howitzer batteries provided for is one. I am now referring to the latest model of mountain howitzer battery, which has not been adopted very long and which has not been pushed very hard, because the mountain howitzer, which is becoming obsolete and from which we are getting away, is, nevertheless, the most modern of all the artillery which is becoming obsolete, and, therefore, we have not pushed that as fast as we have the others; we have a number of batteries of mountain howitzers which we are getting away from, but which are still serviceable. So, of the new class, we have used the money which we have had thus far for only one.

Mr. SHERLEY. How many of the old ones have you?

Gen. CROZIER. 120 guns; that is, 30 batteries, with which two regiments are now equipped, and the rest are now in storage for reserve. Of the 3-inch gun batteries, which is the most useful gun and the one which will be built in the greatest numbers, we have provided for 125 batteries; of the 3.8-inch howitzer we have provided for 7 batteries; of the 3.8-inch gun we have provided for 2, and are not going to build any more—not according to the present plans at least; of the 4.7-inch howitzer, of equal mobility with the 3.8-inch gun, we have provided for 7 batteries—either built or building; of the 4.7-inch gun we have provided for 10 batteries; and of the 6-inch howitzer we have provided for 8 batteries—making 160 in all. Now, I will answer your question, if you like, and tell you that by June 30 next we will have one hundred and thirteen 3-inch gun batteries; two 3.8-inch gun batteries; ten 4.7-inch gun batteries; seven 4.7-inch howitzer batteries; and eight 6-inch howitzer batteries.

NOTE.—In the form of a table the foregoing statement is as follows:

Type of battery.	Total batteries required.	Total batteries appropriated for.	Total batteries completed Jan. 4, 1912.	Total batteries completed and to be completed by June 30, 1912.
3-inch mountain.....	27	1		
3-inch field gun.....	195	125	98	113
3.8-inch gun.....	2	2	2	2
3.8-inch howitzer.....	36	7		
4.7-inch gun.....	15	10	6	10
4.7-inch howitzer.....	36	7		7
6-inch howitzer.....	15	8		8
Total.....	325	160	106	140

Mr. SHERLEY. What do you expect to obtain, in various kinds of batteries, out of the estimate of \$1,002,000?

Gen. CROZIER. We expect to get with that sum, if it shall be appropriated, three 3-inch mountain howitzer batteries complete, at \$34,442 each, making \$103,326; four 3.8-inch howitzer batteries complete, at \$102,268 each, making \$409,072; three 4.7-inch howitzer batteries complete, at \$130,068 each, making \$390,204. And then we expect to get reserve parts, spare parts of breech mechanisms and spare parts for carriages, etc., amounting to about 11 per cent of the original cost of these batteries, making \$99,398.

Mr. SHERLEY. Of these various kinds of batteries, what do you consider most desirable and needed at this time?

Gen. CROZIER. As I said a moment ago, ordinarily speaking, the 3-inch gun is the most useful gun; but we have more 3-inch guns than we have of the other kinds, so that I think, perhaps, we might say that of all these the 3.8-inch howitzer is about the most needed at the present time and considering the present state of supply.

Mr. SHERLEY. Upon what basis, as to size of the Army, is the desired mobile artillery estimated?

Gen. CROZIER. That is based on an estimate of the following number of batteries to be ultimately needed: Twenty-seven 3-inch mountain howitzer batteries; one hundred and ninety-five 3-inch gun batteries; thirty-six 3.8-inch howitzer batteries; thirty-five 4.7-inch

howitzer batteries; fifteen 4.7-inch gun batteries; fifteen 6-inch howitzer batteries, making a total of 323 batteries, which, with the two batteries of 3.8-inch guns which we have already but do not intend to reproduce, will make 325 batteries. The 323 batteries are based upon an estimate of about 3.16 guns per thousand of the gross strength of infantry and cavalry for an army of about 450,000 men, plus a reserve of about 95,000 men, and for the insular possessions about 25,000. The army of about 450,000 men is that which the latest studies have indicated as being properly required to put in the field at the outbreak of a serious war. The total force mentioned is 570,000, having gross infantry and cavalry of 409,000, and does not include Coast Artillery troops. The Coast Artillery troops, if called into the field, would, however, comprise a considerable part of the 95,000 reserve mentioned.

Mr. SHERLEY. Do you mean by 450,000 men the entire Army or—

Gen. CROZIER (interposing). I do not mean the Infantry and Cavalry; I mean the entire Army.

Mr. SHERLEY. Now, what number of Infantry and Cavalry will correspond to an army of 450,000 men?

Gen. CROZIER. The number of Infantry and Cavalry would be 333,000, correspond to an army of 450,000. This number of 323 batteries will also provide for the additional 95,000 troops already mentioned, and also a few guns which will be used in the insular possessions, and therefore will not be available for use with this army of which I am speaking. This is the total gross number of guns which will be required for all purposes, of this character.

Mr. SHERLEY. What have been your estimates heretofore as to the number of guns per thousand of Infantry and Cavalry, and what have been your estimates as to the size of the Army?

Gen. CROZIER. I have spoken to the committee heretofore of an estimate of 2 guns per thousand for an army of the total strength of 600,000, which would mean 1,200 guns. Now, the number which has been arrived at, by the studies of which I am now giving you the result, is 1,292 guns, so that it is not so very much above what I have spoken of heretofore. The total number of troops that we will have in the mobile Army in the United States and in the insular possessions, if we have this mobile army of 450,000 men which I have been speaking about, would be 475,000, and an additional force, of which the Coast Artillery would form a part, would be 95,000, making 570,000 in all; and the 1,292 guns, which I am now giving you as our final estimate, would amount to 2.3 guns per thousand on this gross strength. So there you can see just how much change has been made from 2 guns per thousand gross on an estimated army of 600,000 to 2.3 guns per thousand on a gross army of 570,000 men; it is from 1,200 guns to 1,292 guns.

Mr. SHERLEY. When you reduced the size of your Army you increased the proportion of guns desirable, so that you have not lessened but have actually increased by 92 the number of guns. What has happened to bring about that condition?

Gen. CROZIER. We have increased the number of guns, but see how little we have changed. I have always talked to you heretofore about 2 guns per thousand; that is, 2 guns per thousand of the gross Army, and the result of careful plans made by the General

Staff, which was not in existence when I first commenced to talk about this subject, is 2.3 per thousand and for 570,000, and I think that is a remarkable illustration of how close an estimate I made.

Mr. SHERLEY. Except that if we were to take your estimate as to the number of guns per thousand and then accept the modified estimate as to the number of men, which is 450,000, that would cause quite a material reduction in guns over what is now shown.

Gen. CROZIER. But the point where I would find fault with that question, Mr. Chairman, is that the present Army, considered, is not 450,000 men but 570,000.

Mr. SHERLEY. I understood you to say awhile ago that these guns were figured on the basis of an army of 450,000.

Gen. CROZIER. A mobile army of 450,000, which excludes the reserve of guns corresponding to 95,000 men and excludes the forces in the insular service.

Mr. SHERLEY. And when you estimated on the basis of 600,000 you included those?

Gen. CROZIER. I included everything and everybody, and now everything and everybody makes 570,000 instead of 600,000, and the proportion of guns makes 2.3 per thousand instead of 2 per thousand, as estimated heretofore.

Mr. SHERLEY. You are asking for money in the Army bill for this purpose, are you not?

Gen. CROZIER. Yes, sir; and I do not know that that can be explained at any better place than right here. The sum total of guns which we wish to get, both from the appropriations in the Army bill and from the appropriations in this bill, does not exceed the number that I have mentioned to you, but there has been a little change in the manner of looking at the supply source. You may remember that some years ago, I think about seven or eight years ago, the practice was commenced of appropriating for field artillery for the Organized Militia in the Army bill, and we carried that along until we had enough guns for all of the field artillery that was organized, and then we stopped there—did not look any further; in other words, we did not plan ahead with reference to the Organized Militia. Now, however, there are two things to be considered with reference to that. If the militia is to be called into the service at its present peace strength and to have the proportion of guns that we consider suitable, the 50 batteries would not be enough, and if it were to be called into service and recruited up to its war strength and had the proportion of guns that we have considered proper for the mobile force, the shortage would be still greater; therefore we have formed a plan of providing artillery for the Organized Militia as it is expected to be when called into the service at war strength.

Mr. SHERLEY. Right in that connection will you state what it is estimated the size of the militia at peace and war strength should be?

Gen. CROZIER. The militia as it is now, I think, is about 128,000 men all told, and it is very largely infantry and cavalry; figures which may not, perhaps, be the latest, but which were true a short time ago, give 101,000 infantry and cavalry; call it 100,000 infantry and cavalry; that would mean that at 3.16 guns per thousand we would have 100 times 3.16, or 316, guns as the proper number for the Organized Militia proper, the proportionate number for the Organized Militia at the strength it now is, the peace strength;

whereas we have 240 guns provided for, and that would leave us 76 guns short. Now, the war strength of those same militia organizations, if the regiments were properly recruited up, would be 189,000 of the gross infantry and cavalry, and by multiplying that by 3.16 we would find the number of guns suitable for that force, and by dividing that number of guns by four we would arrive at the number of batteries.

Mr. SHERLEY. About 40 per cent, then, of the guns that are estimated as being needed for the Army should be supplied from the appropriations for the militia, which come out of the Army bill?

Gen. CROZIER. It works out something like that, yes. So, in accordance with the plan of 323 batteries of 1,292 guns, 174 batteries and 696 guns would be provided for in this bill and 149 batteries and 596 guns would be provided for in the Army bill.

Mr. SHERLEY. What is the total of the appropriations that have heretofore been made for this purpose?

Gen. CROZIER. I think, perhaps, I can give you the whole amount together. The total appropriations made to date for modern field artillery, including this bill, which includes both this item of the bill and the item for alteration of certain batteries, which is another item in the same bill, and the appropriations for the militia in the Army bill, have been \$8,444,457.90. In this bill, under this item, there have been appropriated \$4,572,200.

Mr. SHERLEY. Over a period of what time?

Gen. CROZIER. Since 1904: the first appropriation that I am taking into consideration was made on March 3, 1903.

Mr. SHERLEY. There have been appropriations prior to that, running back to 1890.

Gen. CROZIER. Yes; but they were for a different type of gun; they were principally for the gun which we are now altering to the present gun, the 3-inch gun, under the appropriations which are made in another item in this bill.

Mr. SHERLEY. Inasmuch as the alteration results in the creation of new guns, those former appropriations ought to be considered in arriving at what has been spent for the mobile artillery, ought they not?

Gen. CROZIER. I hardly think so, although you might do it. Of course, if you are going to consider what we have spent for mobile artillery, you could go back to the beginning of the artillery service; but I think, perhaps, it would be more illuminating to consider appropriations which have been spent for artillery of the modern kind; in construction of such artillery we use some of this old artillery as raw material, and we are getting the benefit of that.

Mr. SHERLEY. It is hardly accurate to speak of it as raw material, because it is, in point of fact, more valuable than if it was in that form, and it cost the Government money heretofore.

Gen. CROZIER. Yes, sir; the question would then arise, How much of the original value can you charge against the original appropriation? All of the material is not useful; the original cost of the obsolete batteries plus the cost of transforming them into new batteries would be more than the original cost of new batteries—the same number of new batteries.

Mr. SHERLEY. Well, without pursuing that particular matter further, how long have you been obtaining money from the Army bill

for modern mobile artillery, and what is the total of the appropriations?

Gen. CROZIER. The first appropriation was made by the act of April 23, 1904, and there were then appropriations made in 1905, 1906, 1907, 1908, and 1911, skipping 1909 and 1910. In addition, there was allotted a sum of money from a lump appropriation, which was made in 1903, for bringing the armament of the militia of all kinds up to date at that time, and all of those sums together add up to \$4,235,377.90.

Mr. SHERLEY. Then, although the number of guns to be supplied to the militia and the number of guns to be supplied to the Army is as 46 to 54, you have actually received about an equal sum of money?

Gen. CROZIER. That is approximately correct, Mr. Chairman.

Mr. SHERLEY. And that notwithstanding the fact that the militia, as at present organized, is not in a position to even take care of a very large proportion of this material?

Gen. CROZIER. That is true also; we have to take care for them of the reserve material which it would be intended to issue to the militia if it came into the service at its war strength, and we would have to take care of the additional artillery material which they should have even at their peace strength, and which they will have as soon as we can persuade them to go to the expense of organizing and maintaining those batteries.

Mr. SHERLEY. The Committee on Military Affairs, then, has been somewhat more liberal to these items than the Fortifications Committee?

Gen. CROZIER. I think that is an unimpeachable deduction, Mr. Chairman.

Mr. SHERLEY. What length of time is required in the manufacture of these various field pieces?

Gen. CROZIER. It varies. I suppose we can take the gun as the measure of the time required for the completion of everything that goes with the gun, because there are more establishments in the country that can produce gun carriages, caissons, etc., and material necessary for them than there are establishments which can produce the material for the guns and complete the guns.

Mr. SHERLEY. Are the guns that are allotted to the Regular Army and militia always allotted with a view to funds from which they have been created—I mean in numbers?

Gen. CROZIER. In numbers; yes. We do not issue to the militia more guns than appropriated for under the item appropriating for the Organized Militia; if we should issue to the militia more of such guns we would require a reimbursement of the appropriation from the appropriation for arming and equipping the militia, which is made in the Revised Statutes.

Mr. SHERLEY. Well, in point of fact, have you issued more to the Regular Army than this appropriation would have warranted, charging it with the sum necessary to reimburse the militia?

Gen. CROZIER. No; we have not; as a matter of fact, we have the Regular Army supplied with all the field guns that its organization now calls for, and we have some reserve guns left, so that we have not drawn upon the guns provided for in militia appropriations in order to supply the Regular Army.

Mr. SHERLEY. In your former answer did you state the number of guns required for the Army as it exists to-day?

Gen. CROZIER. I have not stated that to-day.

Mr. SHERLEY. I wish you would state that.

Gen. CROZIER. There are six regiments of six batteries each, and each battery has 4 guns, so that there would be 4 times 36 or 144 guns required; and they have those 144 guns now in the Regular Army, two of those regiments being regiments of Mountain Artillery, and the 12 batteries of those two regiments having the mountain gun, which is becoming obsolete. Now, here are the times required to build various guns: Working at the gun factory at Watervleit Arsenal—and nobody could do it any faster—and working one shift, a 3-inch field gun would require three and one-half months after the receipt of the forgings of the gun, which would, perhaps, take, if they were going in in large numbers, I should say, a couple of months; guns of the heavier type accompanying the mobile Army would require about four and a half to five months, so that it would probably take five months, working as fast as they could work from the date of the order for manufacture, to commence deliveries of complete batteries of 3-inch guns or about that size, and then after that they could go on at the rate of something like a half a dozen batteries a month. For the heavier ones—taking, for instance, the 4.7-inch gun, the 4.7-inch howitzer, and the 6-inch howitzer—the first battery could, perhaps, be delivered in something like seven months, and then for a couple of months they could, perhaps, deliver three a month, and then after that could get the delivery up to five batteries a month.

Mr. SHERLEY. Now, what length of time would necessarily be required in bringing the Army from its present strength to its maximum war strength?

Gen. CROZIER. I think, Mr. Chairman, that would depend very largely on the conditions; if we should have occasion to increase the Army under circumstances producing anything like the enthusiasm that accompanied the preparation for the Spanish War we could get the personnel enrolled very rapidly.

Mr. SHERLEY. Well, I had in mind getting it in such condition that would warrant the delivery to it of material of this character.

Gen. CROZIER. I should say that if the personnel of the battery could be gotten together under experienced officers down to and including the grade of captain, and with lieutenants, inexperienced officers, and with, perhaps, an experienced noncommissioned officer in each battery, then they would arrive at a stage in which they should be given this material to commence to learn about it in about a month. There would be a question of expediency there as to whether they should be given the guns and carriages, etc., before they should be given their horses; my own opinion is that they should be.

Mr. SHERLEY. What I am trying to arrive at is this: At what period of time would it be desirable, assuming that the Army had to be recruited up to its strength for purposes of war, to have the guns to deliver?

Gen. CROZIER. I should think that we ought to have them within a couple of months, under the present circumstances, of the time at which it is decided to put the Army on its war footing. However, I think the circumstances ought to be such and can be such, and it is

the duty of the Government to have them such that this material would be needed in a fortnight.

Mr. SHERLEY. I appreciate that; but in the absence of that condition existing, is there any particular need of our advancing so rapidly in the supply of this material? You now have all of the batteries that are needed by the Regular Army, with some reserve; you now have all the batteries, and more, that can be distributed among the militia, and the question necessarily arises, in connection with as large an item as this, as to the present need of supplying the batteries in the amount requested.

Gen. CROZIER. The Regular Army, of course, is such a small force that the fact of its being completely equipped with everything that it requires is one of no great moment, when you consider the force that ought to be equipped. The whole idea of preparation for war in this country is and ought to be the maintenance of a small force continually in the service and the rapid expansion of that force in time of war or threat of war, which rapid expansion ought to be possible to be made with men who will already have had some training. Now, if we should ever arrive at that state, as I say, we would need this material. If there should be a state of confusion, lack of preparation, or absence of method by which the Army could not be increased in size rapidly and effectively, I should not like to undertake to say how much we might be slack in one element to meet the slackness in others.

Mr. SHERLEY. The present Army is more than sufficient in size for any offensive movement that we would ever contemplate?

Gen. CROZIER. I do not think so, Mr. Chairman, by any means.

Mr. SHERLEY. Your idea of an army of 450,000 men is a defensive army of that size, is it not?

Gen. CROZIER. Yes. But the number of troops that we could use offensively is very different from the Army that we now have. Of course, I might go on and amplify on that, but I could not tell you anything that you are probably not as well aware of as I am with regard to the possibility and necessity of using a larger force in any of the problems that may confront the country.

Mr. SHERLEY. What is the condition of the Treasury balance under this item at this time?

Gen. CROZIER. On the 4th of this month the balance in the Treasury was \$1,425,317.24; of that balance there was due to the various arsenals for carrying on the orders which have already been given them, and on which they have commenced work, \$760,486.93, and there is needed to meet the contracts for manufacture of this class of material by private individuals, which contracts are already in existence, \$574,316.53, and there is an unallotted balance of \$90,513.78, which we have not yet assigned to any particular matériel, but which probably will be so assigned soon after this next appropriation shall be made; at this stage of the year we do not like to cut this balance down any lower than this point because there are always contingencies; some of our material might not turn out well, and we would need something with which to make good any defective designs or anything of the sort which might supervene.

Mr. SHERLEY. What is the condition as to the time of probable deliveries, in reference to payments of both the sums due to the arsenals and sums due to private contractors?

Gen. CROZIER. It would take me a little time to give you a very accurate idea about that. I have not worked it out for presentation to you here, because, as the appropriations have been made, it would not affect any of these affairs or any of these contracts, because I can not give an order or I can not make a contract until all the money for the complete execution of the order or the complete execution of the contract is available; I am prohibited from doing that under the law, unless I have a special statute authorizing it in a particular case.

Mr. SHERLEY. What I was trying to arrive at was just the condition, in point of time, of the contracts that were let, and whether it is not true that we have been appropriating money faster than you gentlemen were succeeding in spending it.

Gen. CROZIER. I keep track of that Mr. Chairman, and if I find that more money is appropriated than can be spent profitably and reasonably at the arsenals within such time as it ought to be, then I draw on private manufacturers and give contracts to them, so that it can safely be said that I can efficiently use, in the most rapid manner which accords with my judgment, all of the funds which I am estimating for.

Mr. SHERLEY. If, in point of fact, you should now be given \$1,000,000 you could not have any need for that amount of money prior to the 4th of March of next year?

Gen. CROZIER. I would not need it all before the 4th of March of next year, and it would suit my purposes if you should authorize the expenditure of it for the items covered by the language of this appropriation, and appropriate, say, half of it, and throw the remainder on the succeeding Congress.

Mr. SHERLEY. In private contracts only about 25 per cent is given to the contractor at the time of the purchase of material, and then some 50 per cent upon delivery, 25 per cent being held until it is ascertained that the material is up to the standard?

Gen. CROZIER. That is a specification which we often make in the terms of the contracts.

Mr. SHERLEY. Now, what is the condition as to the time of expenditure of money where the material is manufactured in the arsenals and not let by private contract? How rapidly do you have to spend that money?

Gen. CROZIER. We have to spend that as rapidly as we can in payment for material which is procured, and also we have to meet our pay rolls almost immediately; that is to say, we have to pay four times a month, and perhaps it takes four or five days to make up the pay roll; therefore, as far as we are concerned, we are not more than four or five days behind the incurrence of the obligation.

Mr. SHERLEY. Is there any reserve held in view of defective material made at the arsenals?

Gen. CROZIER. Yes; this \$90,000 which we now have as an unallotted balance in the Treasury would be used for that purpose.

Mr. SHERLEY. In this connection, General, how does the cost of the guns made at the arsenals compare with the cost under private contract?

Gen. CROZIER. It is, generally speaking, considerably less. I think I have some figures here which will illustrate that, although I did not bring them down with special reference to this bill.

We have comparatively recently made some 3-inch gun carriages at the Rock Island Arsenal of the character referred to in this item for \$2,510 apiece, and we have procured the same gun carriages from private manufacturers who had had experience in their manufacture, because this was not their first order, for \$3,398 apiece, which is an increase of about 35 per cent over the cost of our own manufacture.

I will give another example or two, if you would like me to do so.

Three-inch caissons at the Rock Island Arsenal are produced for \$1,128 each, and we have paid, under contract, to the same kind of experienced manufacturers, \$1,744 for the same caissons, which is an increase of about 54 per cent over our own cost.

Mr. SHERLEY. In arriving at your own price, I notice in the hearings of last year that you stated that in addition to the natural overhead charges you had figured a percentage of about 17.6, as I recall it, to be added to that, so as to be sure of having embraced every conceivable or possible charge. In making these figures as the cost was that 17 per cent added?

Gen. CROZIER. I think, although the idea is what I expressed, that the particular 17.2 per cent which you have in mind was referring to a related subject, but was not just exactly—

Mr. SHERLEY. I did not mean that it related to this particular kind of manufacture, but I gathered from the hearing that you had ascertained about what percentage should be added to what you had figured as an overhead charge, so as to incorporate the consideration of all possible subjects of expense.

Gen. CROZIER. Yes; that comes more nearly to it.

In these costs which I have given you there is added in an amount, which is not paid out of this appropriation, for overhead charges, such as interest on the value of the plant and the pay of officers, which comes out of the Army appropriation bill, and the depreciation of the plant; such items as that. To cover those items I have added 8.4 per cent to the manufacturing cost paid out of this appropriation at the Rock Island Arsenal. In the instance of which you are speaking, I was endeavoring to meet a suggestion which is sometimes made that in counting this overhead charge we do not count in everything. Something gets away; that we, perhaps, make an undue allowance for the expense for conducting the arsenal as an arsenal of issue and storage, and charge less to manufacturing operations than we ought to.

So, I say, in order to meet that, I had a carefully made up statement referring to the Springfield Armory, in which I took into account not only the charges of interest, depreciation, etc., which I have just mentioned to you, but every item of expenditure that was made at the Springfield Armory for manufacturing or any other purpose, considering every cent of money that was sent up to them there. We spend a good deal of money in issuing to the service, you will understand, and money for watchmen, etc., for taking care of material in store. And, of course, there is interest and depreciation on the storehouses, which have nothing to do with the manufacturing establishments, but which would have to be there if we purchased the material from private manufacturers and simply stored it at the arsenal; and the value of the ground on which the storehouses rest, and its interest. So, taking all that into consideration, I

arrived at what might be called an exaggerated cost of manufacture at the Springfield Armory, which those manufactures could never reach, and that was 17.2 per cent more than the cost which I reported.

Mr. SHERLEY. Now, was that figured in as to cost?

Gen. CROZIER. No; it was not, because all we know about that cost is that it is too great. In getting everything in that can be figured in, with reference to these illustrations which I have given you, including all the overhead charges chargeable to manufacture, which the private manufacturer has to take into account, except profit, and except also our pensions, namely, the retired pay of the officers and enlisted men, which I have not included, but, taking everything else into consideration, I have arrived at the cost which I have given you.

Mr. SHERLEY. Assuming that cost to be accurate, it would be desirable, then, that you do this work by the Government as far as possible rather than let it to private manufacturers by contract?

Gen. CROZIER. As a mere matter of economy of manufacture, I think it would, Mr. Chairman; but there are several reasons why the other course ought to be followed, to a certain extent. For one thing, we desire to have available in the country a greater plant than that which the Government will maintain, and unless we give them some work we can not expect these people to be able to do this kind of work when we want them to do it; it is not only plant but experience which we would like to have in the possession of manufacturers.

Mr. SHERLEY. What proportion do you let by contract, and what do you do yourselves?

Gen. CROZIER. The figures I have just given you would throw some light on that. We have now due to arsenals to carry on the manufactures which they have under way under this item about \$760,000, and due on the contracts—I do not mean yet due for payment, but reserved to meet the obligations of contracts we have made—we have \$574,000.

There is another reason why I like very much to have some particular item of each class procured from private manufacturers, and that is that if I were doing it all myself there is nobody in Congress and nobody in the executive departments of the Government who would have time to let me demonstrate to him that I was doing it economically; but if I have a comparison of prices which I can give at once for the same material manufactured by the Ordnance Department and procured from private manufacturers, that is an easy illustration; and I can in this way satisfy the natural desire of my superiors in the administrative branch of the Government and of the responsible body which makes the appropriations as to whether or not the expenditures are economically and efficiently made, and it is a great comfort to me to be able to have that easy comparison.

Mr. SHERLEY. General, it has been suggested that I ask you what rate of interest and what per cent for depreciation you have charged in arriving at the costs in the arsenals.

Gen. CROZIER. The usual charge for interest is 3 per cent. In making these items up in the past I have sometimes charged only 2 per cent, because the Government has borrowed money at 2 per cent. I endeavor to charge the interest as that at which the Government can borrow money; but I have reflected that the 2 per cent which the Government has been able to get its money for sometimes in the past was not an exact illustration of the borrowing rates, because the

bonds which paid that rate of interest carried certain privileges as to the issue of currency, which partially accounted for the low rate; but the Government can borrow at 3 per cent right along and the private manufacturer can not. He must charge 5 or 6 per cent. So that in making the comparison there is this advantage, and I think it is a legitimate advantage, coming from the Government's better credit; just as one private manufacturer would have an advantage over another private manufacturer if, because of his better credit, he could borrow money for his plant at a lower rate of interest. It is a perfectly legitimate advantage.

Mr. SHERLEY. As to depreciation, what do you charge?

Gen. CROZIER. As to depreciation, that depends somewhat on the character of the machinery and buildings. For instance, here is an illustration, which we will come to a little later, in the rate of depreciation charged at the powder factory. Powder-making machinery is subject to rapid deterioration, and I therefore charge 10 per cent on that. The factory buildings used in powder manufacture are also not of a very substantial character. Some of them are and some are not. It is considered wise not to have them of a very substantial character, because sometimes they get blown up. Therefore we have charged what I consider a rather high depreciation of 5 per cent. Upon dwellings and storehouses and buildings which last a long time, we have charged depreciation of 2 per cent.

Mr. SHERLEY. General, it was suggested awhile ago in one of your answers that you had no present authority to enter into any contract for the manufacture of any of this material without having the money for its final cost?

Gen. CROZIER. Yes, sir.

Mr. SHERLEY. In other items of the bill having some reference to ordnance, in regard to seacoast guns, there have been provisions made whereby you were given power to go ahead with an allotment covering only a necessary sum of money then needed?

Gen. CROZIER. Yes, sir; it can be covered by special legislation, but it requires special legislation.

Mr. SHERLEY. Is there any objection to that sort of provision as to items embraced herein?

Gen. CROZIER. No, there is not, Mr. Sherley, except that it complicates the matter of looking out for it a little bit; but that is perfectly practicable, and, of course, it does not save any money in the long run.

Mr. SHERLEY. I understand, but it does save an unnecessary appropriation at a particular time.

Gen. CROZIER. Yes; and, of course, if the necessities of a private manufacturer in comparison are taken into consideration it might be considered as saving the interest on the money. If the Government would be considered as losing interest on the money as soon as the money is appropriated—it does not, but if that were to be saved, then you would be saving the interest by not appropriating the money until needed.

Mr. SHERLEY. In point of fact, would it not be of some value in letting contracts to enable you to let them for larger quantities and over a longer period of time? Would not that be of value to the private manufacturer?

Gen. CROZIER. Yes, sir; it would, and I can say in regard to that that the amount which I have asked for in this estimate is not great enough to realize on that advantage, but if you should give me four times the amount that I have asked for here, and allow me to spread it out over four times the time I intend to occupy in spending this appropriation, it would be advantageous—I mean not let me spend the money any more rapidly than I will spend it anyway, but let me look farther ahead and give orders which would run for a longer time, so that there would be no more rapid depletion of the Treasury, but there would be more security and the justification of better preparation—that would be an advantage.

Mr. SHERLEY. You had last year under this item \$498,000?

Gen. CROZIER. Yes, sir.

Mr. SHERLEY. Having asked \$860,000?

Gen. CROZIER. Yes, sir. I might refer to the fact that I have been asking for a good deal more than I have gotten, because I have been trying to impress upon the committee that this class of material is that in regard to which our straits are greatest. We are better prepared to enter upon a war with respect to everything else that is to be supplied in the way of material than field artillery and field-artillery ammunition. It is sometimes stated—irresponsibly, of course—that we never get through asking, and that we always represent ourselves as in a deplorable condition.

I would like to have the committee understand that that is not the case with respect to ordnance, and I am not representing ourselves as in a deplorable condition. We are in very fair condition with regard to seacoast armament; we have a very fair supply of small arms and small-arms ammunition; we have a fair supply of equipments; we are not in a condition of distress and apprehension in regard, I might almost say, to any material which it devolves upon the Ordnance Department to supply except field artillery and field-artillery ammunition. So that is something I can say that has resulted from the appropriations that have been made in the series of years past.

Mr. GOOD. What appropriations have been made during the past few years which have been expended for machinery necessary for manufacturing these pieces at the arsenals?

Gen. CROZIER. I could give you those figures by running over my books for a few years past. I have not them here now, but I can tell you in general terms it has been a very small proportion. I do not think it has been, as a rough guess, 4 per cent of the total sums expended, and I think I may say that in every case the value of the machinery has been more than saved out of the appropriation by the decreased cost of production. It is perfectly astonishing, Mr. Good, how quickly many of these machines will pay for themselves by cheaper production.

Mr. GOOD. How many arsenals have we at which pieces such as provided for in this item are manufactured?

Gen. CROZIER. Two, as a regular matter. The guns are manufactured at the Watervliet Arsenal, just above Albany, and the carriages and limbers and caissons are manufactured at the Rock Island Arsenal, in Illinois. Forgings for the smallest guns and a part of the work on the gun carriages could also be done at the Watertown Arsenal, which is in a suburb of Boston; but, as a rule, it is not done

there, because that arsenal is occupied principally with seacoast-gun carriages.

Mr. GOOD. Is your equipment large enough at those two arsenals to economically manufacture these pieces in greater quantities than you have manufactured in the past?

Gen. CROZIER. It is sufficient at the Watervliet Arsenal to manufacture the guns in considerably larger numbers, and we manufacture up there practically all of the guns. At the Rock Island Arsenal it is not sufficient to go much more rapidly than we have been going in the past.

Mr. GOOD. Is it your intention to increase the capacity of the Rock Island Arsenal out of this?

Gen. CROZIER. No, sir; it is not. I intend to carry it along at about its present capacity and then to draw upon private manufacturers for the supply which we can not produce ourselves.

Mr. GOOD. If this increased appropriation should be made, General, is it your intention to increase the orders that you are giving to private manufacturers?

Gen. CROZIER. Yes, sir.

Mr. GOOD. To what extent would you increase the orders given private manufacturers over what you have previously given them?

Gen. CROZIER. I have been occupying the Rock Island Arsenal, as I say about to its capacity. I would not increase the capacity of the arsenal except by improvements in machinery, and so forth. I would not want to put up any more buildings or greatly enlarge the machinery plant. So that pretty nearly all of the surplus would go to private manufacturers. I have now under contract about as much money involved as the manufacture at the arsenal requires, and this appropriation is about double what I had last year. Therefore, I should say that the amount of contract work given out would be at least doubled.

Mr. GOOD. Do you think it is good policy, so far as the Government is concerned, General, to increase the contracts given to private manufacturers when it costs about 50 per cent more to do the work with private manufacturers than it does for the Government to do it?

Mr. SHERLEY. Fifty per cent is too high. .

Gen. CROZIER. In the two instances I have given you, one was 35 per cent and the other 54 per cent, but 50 per cent is, as a general rule, too high. I can not make as much difference as that.

Mr. GOOD. Even at 35 per cent to 54 per cent, do you think it would be good policy to increase the contracts?

Gen. CROZIER. That is something of a question, Mr. Good. There is a good deal to be said in favor of Government manufacture. It is also desirable, when it can be done, to stimulate private invention. We are glad to have private manufacturers familiar with this class of material, in order that we may get the benefit of suggestions which come to the minds of bright people when they are working on this sort of thing. In the Government manufacture it must be remembered that a larger proportion of the sum which is expended for the whole object goes into the hands of the lower class of employees than in the case of the private manufacturers, because we have no dividends and no high salaries. As an illustration, we are

now paying 60 cents a pound for powder purchased from private manufacturers. We are manufacturing that powder at the Picatinny Arsenal, counting only the charges that are paid out of the appropriation, for something under 40 cents a pound. Of course that is not the total charge, because I am not taking in interest and depreciation, etc., when I give you the figure of 40 cents. Therefore, we see that when I come to expend the appropriation for powder, for \$1.20 I can purchase 2 pounds, and there will be employed the labor to manufacture 2 pounds. For \$1.20 I can manufacture 3 pounds, and there will be employed the labor necessary to manufacture 3 pounds. So that when I have manufactured instead of buying it, 50 per cent more labor is compensated out of the same amount of money. That, of course, assumes that the other expenses are going to run on anyway, namely, that the plant will be there, and that the interest and depreciation will continue to be taken care of and the same number of officers will be paid, etc.

Mr. RAUCH. I want to ask you, General, what, if any, consideration you have given to the use of automobiles in connection with mobile artillery?

Gen. CROZIER. We have considered it. I think that the artillery vehicle, for which mechanical power would be most satisfactory, would be the battery wagon, which accompanies batteries; that is, a kind of repair wagon. It marches with the batteries, but does not go into action; and as batteries always march on roads, it would always have a road to go on; it does not have to leave the road to take position. Some years ago we made one and tried it, but it turned out to be rather too heavy and had trouble about bridges, and it was not as mobile as the vehicle which we had drawn by horses, although it was a much more complete repair wagon. So I turned it into a truck and stopped using it for that purpose, and I have not taken up that subject since. I think it is pretty nearly time to take it up again and try it over. I do not think of any better vehicle to try it with than the same kind that we tried it with before.

Mr. RAUCH. Do you know something about the advance made by other countries along this line?

Gen. CROZIER. I do not know of any country which is using motor vehicles for any of its artillery material proper. I believe traction engines are used considerably in foreign armies, and they are then used for all purposes—hauling supplies of all kinds—and are available for hauling artillery supplies, particularly artillery of the heavy siege class, but except for one or two examples of balloon guns and guns of that sort that are intended to run around intermittently or spasmodically, I do not think any nation has gone into the subject of using motor vehicles for the regular field artillery.

Mr. SHERLEY. Mr. Courts informs me that there is an article in the Scientific American on this matter, about France using automobiles and motor power for batteries.

Gen. CROZIER. I think that before those vehicles commence to be used for the batteries proper they will have to demonstrate their superiority for certain things which are connected with the battery use. For instance, there is the ammunition train for reserve ammunition. They might be useful there, and I would try them for that purpose much sooner than I would try them for the actual traction of the guns and the ammunition which must immediately accompany the batteries.

Mr. SHERLEY. One other question, General. What amount is it estimated will be necessary to be expended in addition to funds on hand to supply all of the material appropriated for under this item?

Gen. CROZIER. All of the material of that class, that is?

Mr. SHERLEY. Yes.

Gen. CROZIER. The plan is to estimate in this bill, under this item, for this class of material \$14,336,936.80. Of course those cents are not important, you understand, but they come from multiplying out the cost of details. We expect to estimate under this bill for the alteration of older batteries to modern batteries \$893,750, and we expect to estimate for the harness for that material, which comes under another appropriation in the Army bill, \$2,058,720. I will tell you in a moment why I put that harness in. Now, we expect to estimate for the same class of material for the guns of the militia \$8,820,558, which includes the harness.

Mr. SHERLEY. Right in that connection, what did you ask in the Army bill this year, General, for this material for militia, can you recall?

Gen. CROZIER. \$1,600,000 for the artillery proper and \$1,500,000 for the ammunition.

Mr. SHERLEY. So that there is \$8,000,000 to be obtained for the militia, and you are asking in the Army bill for this year, out of fourteen millions to be obtained for the Regular Army, you are asking a million—

Gen. CROZIER. The first item of \$1,600,000 we are asking for under the militia.

Mr. SHERLEY. That would be more pronounced with \$8,000,000, all told, for militia you are asking this year in the Army bill for \$1,600,000, leaving \$1,002,000 in this bill.

Gen. CROZIER. The militia is pretty far behind.

Mr. SHERLEY. The militia, as demonstrated a few minutes ago, had received very much more proportionately than what would come out of this bill for the Regular Army. Maybe the explanation is that you are following the line of least resistance.

Gen. CROZIER. There is something else that can be added to that. The militia batteries are much more expensive, because we have to supply with the militia battery everything required to complete the battery. For instance, as I have just mentioned, we have to supply the harness and we have to supply the equipments for the men and for the horses.

Mr. SHERLEY. This estimate was irrespective of the estimates for this additional equipment, was it not?

Gen. CROZIER. The estimate, so far as concerns the militia and the appropriations that have been made for the militia, includes all those items, but the appropriation for the Regular Army does not, because part is provided for by appropriation made elsewhere.

Mr. SHERLEY. What proportion are represented by those other items?

Gen. CROZIER. That can be shown by the relative cost of the 3-inch battery for the Regular Army and for the militia. The cost of a 3-inch battery, as we issue it for the regular service, is \$77,550, and the cost of a militia battery, as we issue it to the militia, is \$94,256. These notes, you will notice, cover a good many details, and sometimes we have to look through them to find the right ones.

I will have to modify an answer I gave a moment ago, Mr. Chairman. The \$8,820,558 which we expect to estimate for for field artillery for the Organized Militia hereafter does not include the harness, but the value of that harness, as well as the harness for the artillery which we manufacture from appropriations under this bill, is included in the \$2,058,720, which I stated a moment ago applied only to the artillery for the Regular Army and the reserve, so that the sum total is the same.

Mr. SHERLEY. The fact remains, however, that you are estimating for the completion of the material for the militia in a very much shorter period of time than you are the completion of the material for the Regular Army.

Gen. CROZIER. In case of preparation for war, the first force which will be called upon to augment the Regular Army will be the militia, and then after that will be a force in the nature of volunteers. So that we will supply, first, the Regular Army, then the militia, and then the reserve of volunteers.

Mr. SHERLEY. Yes; but you do not mean first the Regular Army at its present strength?

Gen. CROZIER. No; Regular Army at war strength.

Mr. SHERLEY. After that you are extending the period of time over which you wish this material to be produced very much longer than that for the militia.

Gen. CROZIER. Well, we need a less amount of material for the Regular Army recruited up to its war strength than we need for the militia recruited up to its war strength. You see, I am providing for three parts of a war army: I am providing for the expanded Regular Army and for the expanded militia, and then for a volunteer force. Now, the expanded Regular Army needs being met, the second thing is the expanded militia, and the third thing is the volunteers. The artillery for the volunteers will come out of this appropriation bill, but that is the third thing. So that this bill takes care of artillery needed for the first purpose and for the last purpose of the three involved.

Mr. SHERLEY. But still it remains, does it not, that you are asking for the completion of the material for militia in a very much shorter time than you are for the material that is used for the Regular Army, excluding the volunteers?

Gen. CROZIER. No, sir; I do not think that it will figure out that way, because we have to consider more artillery now than is needed for the Regular Army as at present organized.

Mr. SHERLEY. Yes; but not war strength.

Gen. CROZIER. No; not war strength. Mr. Chairman, I can go ahead in answer to that question and say that the expanded Regular Army, when brought up to its war strength, would contain about 65,000 Infantry and Cavalry, and the proportion of guns which we are estimating for would amount to about 52 batteries. Now, there are provided for already 160 batteries, and of those 160 batteries 60 have been provided for the militia, leaving 100 for other purposes than the militia. And as the Regular Army expanded to its war strength would require only 52, there are 48 batteries already provided for the third purpose I have been considering, namely, volunteers, so that the expanded Regular Army is already provided for.

Mr. SHERLEY. That being so, then we had better go very slow with this estimate until the militia end of it is taken care of in the Army bill.

Gen. CROZIER. I would not put it that way. You had better go fast, but they had better go faster.

FOR THE PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR MOUNTAIN, FIELD, AND SIEGE CANNON.

Mr. SHERLEY. Going to the next item—for the purchase, manufacture, and test of ammunition for mountain, field, and siege cannon, including necessary experiments in connection therewith and the machinery necessary for its manufacture at the arsenals—you ask \$1,500,000.

This is for the reserve ammunition for the material supplied under the former item, is it not?

Gen. CROZIER. Yes; it is.

Mr. SHERLEY. You have an estimate three times your estimate of last year and five times your appropriation of last year, General.

Gen. CROZIER. Yes, sir; that is for a reason which I partially explained a moment ago, simply to provide for the accumulation of a reasonable reserve at a much better rate than we have been going. The amount that is carried by this estimate, together with an estimate of the same amount which is in the Army bill under the Organized Militia, would provide only 25 per cent of the amount of ammunition which would be required to complete the prescribed allowance for the guns that have been appropriated for up to the present time, the 160 batteries that have been already appropriated for. Of course, it would be a much smaller percentage for the guns that we need. Taking it as a matter of value, the value of ammunition on hand is about \$1,700,000, which is approximately 12 per cent of the value of that which we should have for the batteries which have been already provided for, and it is only about 7 per cent of what should be provided for the batteries which we hope to get.

Mr. SHERLEY. What is the percentage for the batteries which you actually have issued?

Gen. CROZIER. The ammunition on hand and under manufacture is about 12 per cent of the allowance for 160 batteries. We actually have issued about 86 batteries, so it is about 22 per cent of the allowance for the batteries that we actually have issued.

Mr. SHERLEY. When you say this you mean what you now have and what you would have plus this estimate?

Gen. CROZIER. I am speaking of that which is now on hand.

Mr. SHERLEY. General, what per cent have you now of ammunition for guns that are either issued or in the state in which they could be issued?

Gen. CROZIER. The total value of the ammunition allowance for the guns that are already issued or are ready to issue is about \$8,500,000; and we have on hand, as I have just said, about \$1,700,000 worth, so we have on hand something like 20 per cent of the ammunition for the guns which we have already manufactured.

Mr. SHERLEY. If this sum was allowed, bearing in mind the number of guns that would be ready for issue by the time this money would be expended, what percentage of ammunition would you have?

Gen. CROZIER. For the additional guns that will be ready for issue by June 30, 1912, the ammunition allowance will cost about \$4,000,000. Having now about 20 per cent of the allowance for the guns issued and ready for issue, the amount required will be increased by about 50 per cent, we would have about 14 per cent—between 14 and 15 per cent. In other words, we have now on hand between 14 and 15 per cent of the ammunition in value necessary for the guns which we will have manufactured by June, 1912. Then if we add the estimates which we are making in these bills, that will then give us about 40 per cent of the proper allowance for the guns which we will have by June 30, 1912.

Mr. SHERLEY. What do you estimate as the proper reserve which should be had for these guns?

Gen. CROZIER. Do you wish that in money value or in rounds of ammunition?

Mr. SHERLEY. You might give it to us in money value and then indicate what would be actually ammunition.

Gen. CROZIER. I have just said the proper allowance of ammunition for the guns which we have now would amount to about \$8,500,000, and the proper allowance for ammunition for the guns which we expect to have by June 30, 1912, would be about \$12,500,000. I can tell you here what we consider to be the proper allowance of ammunition: Take the class of gun that we now have issued, or ready for issue—3-inch field guns—the allowance per gun is 1,856 rounds; for 3.8-inch field gun, 928 rounds; and for the 4.7-inch guns the allowance per gun is 1,344 rounds. Now, I can give you that in more detail to show you just where we expect to carry that ammunition. Take the 3-inch mountain howitzer battery to commence with. We expect to have with each gun 160 rounds. We expect to have with the mobile forces a sufficient additional amount to bring to approximately 212 rounds per gun the total amount with the Army, including that which is directly with the batteries and that which is with the Army ammunition train—it figures out 212½ when you come to multiply and divide—and we expect to have at the advance-supply depot—that is, at that supply depot which is nearest to the Army—an equal amount, namely, 213 rounds, and we expect to have at the base of operations, wherever that may be—depending on where operating—an amount equal to the sum of those two, or 425, which makes for the 3-inch mountain howitzers a total of 850 rounds for each gun, or 3,400 rounds for the battery.

For the 3-inch gun we expect to have with the battery and with the Army ammunition train 464 rounds, at the advance depot 464 rounds, and at the base of operations 928 rounds, making 1,856 rounds per gun, or 7,424 rounds per battery.

Mr. SHERLEY. Do you consider all those three items as constituting what you call "reserve ammunition"?

Gen. CROZIER. Yes; because it is all intended to be used for war purposes and not intended to be used in target practice.

For the 3.8-inch howitzer we expect to have with the Army 312 rounds, at the advance supply depot another 312 rounds, and at the base of operations 624 rounds, making for that gun 1,248 rounds and for the battery 4,992 rounds. We expect to have for the 4.7-inch howitzers with the Army 180 rounds; with the advance supply depot, 360 rounds. There, you see, instead of having at the advance supply

depot the same amount of ammunition as we have with the Army, we have double the amount; in other words, cutting down the amount with the Army, because of its being for a pretty large gun, making the ammunition more difficult to carry. We therefore put a greater amount at the advance supply depot and carry less with the mobile army than in the case of the lighter guns. At the base of operations we expect to have 540 rounds for that gun, making 1,080 rounds in all for the gun, or 4,320 rounds for the battery.

Mr. SHERLEY. Have you not, in point of fact, the reserve ammunition to supply the guns in the first instance?

Gen. CROZIER. No; we have not. As previously pointed out, there should be with the guns, especially for the smaller and most necessary kinds of guns, about one-fourth of the total supply; that is, 25 per cent; and we have not on hand 25 per cent of the total amount for the guns that we have ready for issue and issued.

Mr. RAUCH. Suppose, General, Congress should decide to cut the preceding item 75 per cent, what reduction would that warrant in the item now under consideration?

Gen. CROZIER. From one point of view, Mr. Rauch, it would not warrant any reduction, because the item which we are considering now would not bring our ammunition supply up to what it ought to be, even for the guns that we have already secured appropriations for; so that if Congress did not make any appropriation for additional guns now, it would still need all of this appropriation and more to bring the ammunition supply up to what it ought to be for the guns already appropriated for.

Mr. SHERLEY. What time does it take to supply this ammunition, General?

Gen. CROZIER. The Frankford Arsenal can make about 300 rounds of ammunition a day, and a short time ago we advertised for some projectiles for the most important class of ammunition—that is, for shrapnel. We last March called for bids for furnishing 10,000 rounds, some \$75,000 worth, of 3-inch shrapnel and fuses. That is the most typical projectile, and the one which we need the most of by a considerable majority. Wide publicity was given advertisement, but only three proposals were received. The time for beginning delivery under each one of the three proposals was, respectively, five months, three months, and six and one-half months. The rates of deliveries thereafter were, under the first bid, 1,000 rounds per month, under the second bid 1,000 rounds per month, and under the third bid 800 rounds per month. That gives about as good an idea as I can present of the time necessary to supply this ammunition by manufacturer. The prescribed allowance for the guns appropriated for is approximately 1,100,000 rounds, of which number approximately 120,000 are on hand and under manufacture.

Mr. SHERLEY. Do these three bids of private concerns include the maximum capacity of the country to produce that ammunition?

Gen. CROZIER. No, they do not. I estimate that the maximum output for the entire country for the first six months after the issue of orders to run at the maximum capacity would be about 250,000 rounds of mobile artillery ammunition, taking it of the various classes. That is less than was fired by the Russians in a single battle of the Russo-Japanese War.

Mr. SHERLEY. There would, of course, be some time in advance of the actual use of the ammunition, in case of war, when we would know the need of supplying the ammunition?

Gen. CROZIER. Yes; there would be some time.

Mr. SHERLEY. Necessarily quite a little time, would there not?

Gen. CROZIER. Let us see about that, Mr. Sherley. History is a great deal better than speculation in answering any question of that kind. Let us consider the last war we were in—the Spanish War. You may remember that the *Maine* was blown up in the month of February. In the same month of that year—February—the fortifications bill, carrying ammunition for seacoast defenses, was under consideration by this committee, and it was reported to the House of Representatives before the date on which the *Maine* was blown up. The estimate which had come down from the Ordnance Department for ammunition was intended to supply 10 rounds only for each one of the guns that it was then expected would be mounted in the seacoast fortifications by the 1st of the following July; and in submitting that bill to the House of Representatives this committee cut that estimate two-thirds. We were so near the War with Spain as to be in the same month as that in which the *Maine* was blown up. That is an illustration of how far in advance we are likely to get these warnings, and how much prevision is likely to be exercised in giving these supplies.

Mr. SHERLEY. But that hardly answers the question, because even after that date—after the actual blowing up of the *Maine*—there was some time before there could be any actual need for ammunition.

Gen. CROZIER. If I am not mistaken, the *Maine* was blown up on the 15th of February and war was declared on the 21st of April. If those are not the dates, they are very close to them.

Mr. SHERLEY. Some time would have to elapse after that before there could be any actual use made of ammunition.

Gen. CROZIER. To throw some light on our position with reference to ammunition at that time, I would say it happened to be my duty to visit the seacoast fortifications and exercise the Artillery a little bit in the use of the brand-new armament which had been put in. Nobody knew whether the engineers knew how to set it up; nobody knew whether the Artillery knew how to handle it. As a matter of fact, they did not, because it was entirely new and they had none of the kind before. There was not one man in twenty who had seen one of the guns fired and a much smaller percentage who had fired them. For my purpose of drilling and instructing the people who were manning these guns for war I was directed not to expend more than one round of ammunition for each gun, because we could not spare any more; and that lasted till the latter part of that war—until the Battle of Santiago. I was still engaged on the work when the Battle of Santiago was fought, and with that restriction, on account of lack of ammunition.

Mr. SHERLEY. General, in view of what you seem to think the backwardness of the country's position in this item, how do you explain the estimate for 1911—\$150,000?

Gen. CROZIER. For Field Artillery ammunition?

Mr. SHERLEY. Yes.

Gen. CROZIER. I think that was the year, Mr. Chairman, in which we received positive orders from the administration to cut our esti-

mates down away below the figures at which we had originally submitted them.

Mr. SHERLEY. Prior to that—

Gen. CROZIER. I should not like to answer. If you ask me to do so I must ask to be excused from defending that estimate.

Mr. SHERLEY. The estimates prior to that were, respectively, \$300,000 and \$250,000 and \$250,000.

Gen. CROZIER. Yes, sir. The only reason I can give for making those estimates is that they were each time accompanied by the statement that they were too small; but it did not seem to make any difference what they were. They were something like double what we had any hopes of getting, so that the real estimates consisted of the statements that I made to the committee.

Mr. SHERLEY. In each instance where you ask \$250,000 you got \$160,000; where you asked \$300,000 you got \$160,000, and where you asked \$150,000 you got the entire \$150,000?

Gen. CROZIER. That is right; so that as a rule the amount that I got was somewhere near one-half of what we asked for.

Mr. SHERLEY. If the committee took the responsibility for the cut made in the estimate, in view of the statements made as to the condition of affairs generally, it seems to me that the department must take the responsibility as to the size of the estimates that were submitted.

Gen. CROZIER. I think I would ask to be excused from taking that responsibility, because in the hearing the statement was made that the estimate was too small, and the statement was also made as to the length of time which would be required to get a proper allowance under that estimate.

Mr. SHERLEY. Coming to the immediate estimate, how much of the money requested could actually be and would actually be expended prior to March of next year? Is this in a similar condition to the other item where a proportion of the money could not be expended?

Gen. CROZIER. If I purchased one class of ammunition only, Mr. Chairman, I could expend about \$1,250,000 in a year from the time that I started to expend it. You gave me from now until March 4.

Mr. SHERLEY. That is the time when the next bill must have been passed.

Gen. CROZIER. That would be a year and one month. So a million and a half dollars is the outside amount that I could expend on the 3-inch shrapnel ammunition alone. Some of the other classes are more expensive. I think it would probably worry me to spend more than \$2,000,000 by the 4th of March, 1913, for this class of ammunition. I think I could do that.

Mr. SHERLEY. How much have you left now?

Gen. CROZIER. I have not given the exact statement of the Treasury balance of that appropriation. I thought I had, but there is very little left which has not already been allotted for manufacture.

Mr. SHERLEY. You can put in your notes the exact condition of the balance.

Gen. CROZIER. I can put in my notes the exact condition of the balance. I think I can manage to spend \$2,000,000 for this purpose for ammunition actually delivered. Without reference to making contracts for deliveries that would come afterwards, I could spend that for ammunition to be delivered by the 4th of March.

Mr. SHERLEY. You estimate the million and a half in this bill and a million and a half in the other?

Gen. CROZIER. Yes, sir; and if I should get two-thirds of that amount actually appropriated, with the authorization to provide for the ultimate expenditure of the \$3,000,000, I would be just as well off as if the whole \$3,000,000 were appropriated at once.

[NOTE.—The following was the condition of the balance on January 15, 1911, under the appropriation for mobile artillery ammunition:

Balance in Treasury, \$247,459. Nearly all these funds were obligated as follows: Due arsenals for work in progress, \$244,801.42; due on contracts, \$1,462; leaving on hand an unobligated balance of \$1,195.98.]

Gen. CROZIER. I am now able to state the balance in the Treasury under this item, and it was, on January 15, \$247,459. Now, of that balance there was due to the arsenals for orders which they are now executing \$244,801.42, and there was needed to meet obligations of outstanding contracts \$1,462; there was an unobligated balance of \$1,195.98. There are one or two other items of information that I might give the committee if they would interest them. We have looked up, as far as the histories that have been written thus far enable us to ascertain it, something about the expenditure of field-artillery ammunition in the Russo-Japanese War. It appears there was expended at Mukden about 250,000 rounds; one battery of 8 guns at Mukden is reported to have expended 11,159 rounds. At The Schako, during a four days' fight, the artillery of one infantry division of 48 guns is reported to have expended 28,900 rounds—that is, 602 rounds per gun.

Mr. SHERLEY. How many rounds do you suppose one of our guns can fire without being worn out?

Gen. CROZIER. I think one of these field guns could run up pretty close to 2,000 rounds; of course, the smaller guns can fire a great many more rounds than the larger ones.

Mr. SHERLEY. What length of time would that take; that is, how rapidly can they fire these guns?

Gen. CROZIER. The guns are capable on a spurt of firing about 15 aimed rounds a minute. I think, however, if you consider any reasonable length of time, that ought to be cut down at least two-thirds, and if you were to say 5 rounds per minute that would be quite as rapidly as they could be served for any length of time; that would be 300 rounds an hour, at which rate about seven hours would wear out the gun. Of course, there never would be firing at the rate of 5 rounds a minute for seven hours in succession. I think I can say, Mr. Chairman, that when I give 2,000 rounds I do not go beyond the limits of our experience; but our experience has not yet been sufficient to wear out any of these guns, so they will endure more than 2,000 rounds.

Mr. SHERLEY. What percentage of the cost of this ammunition goes into the powder?

Gen. CROZIER. Taking a typical round of ammunition, the cost of the 3-inch shrapnel round is about \$10, and the cost of the powder that goes into it is about \$1—that is, about 10 per cent—and that would run pretty nearly through, because all of this ammunition is of the kind which is put up with a fixed cartridge case, like 3-inch ammunition. I should say, taking it as a whole right straight

through, that the proportion would be from 5 to 10 per cent for the cost of the powder.

Mr. SHERLEY. I believe you stated earlier in the hearing that you were making powder at a cost of about 55 cents, and that you were purchasing powder under contract at 60 cents?

Gen. CROZIER. Yes, sir.

Mr. SHERLEY. What proportion of the powder is manufactured by the Government and what proportion is purchased?

Gen. CROZIER. During the last calendar year, the one just ended last month, we manufactured at the Picatinny Arsenal 460,500 pounds of powder; that is, for both cannon and small arms; we purchased from private manufacturers or placed orders, at least, for 950,000 pounds of cannon powder, and probably the orders for the small-arms powder, which are not given directly through my office but go through the Frankford Arsenal, where most of the small-arms ammunition is made, would amount to 335,000 pounds; so that would be from private manufacturers 1,285,000 pounds, as against 460,000 pounds that we manufactured.

Mr. SHERLEY. How much are you making of small-arms powder?

Gen. CROZIER. We made last year at the Picatinny Arsenal 100,000 pounds of small-arms powder.

Mr. SHERLEY. Is not that arsenal equipped for the making of small-arms powder?

Gen. CROZIER. It is; yes; and we always contemplated making it there, but we did not get the plant going for small-arms powder as soon as we did for cannon powder.

Mr. SHERLEY. What is it costing?

Gen. CROZIER. It is costing about 50 cents a pound; 50 cents a pound is the factory cost only; it is costing, taking all the overhead charges and everything into consideration, about 65 cents a pound.

Mr. SHERLEY. What are you paying for it under contract?

Gen. CROZIER. Seventy-five cents.

Mr. SHERLEY. So that there is a difference of 10 cents between the manufacturing cost and the purchase price of small-arms powder and only a difference of about 5 cents as to powder other than small-arms powder?

Gen. CROZIER. Yes; that is right. The difference is greater in the case of the small-arms powder.

Mr. SHERLEY. Do you see any reason why there should be that much difference in the contract price for small-arms powder?

Gen. CROZIER. The manufacturers claim that the granulation of our present small-arms powder was a very difficult matter to arrive at. The form of the powder is a very small cylinder, about as large as an ordinary pin in diameter, and that has a hole through it, and the central locations of the hole in the cylinder is a very important matter. When you look at one of these things you do not see any hole, and when it is a matter of getting the hole in the center that seems to be a matter of very great refinement. Another point about it is that the machine for cutting off these grains which come out of the press as a continuous string, was hard to develop. However, the private manufacturers, after some ingenuity and some expense and some trouble, developed a good machine for doing that

work, and they think they ought to realize something on that machine.

Mr. SHERLEY. Of course you have the same difficulties in manufacturing that they have?

Gen. CROZIER. Yes; but they were not particularly anxious for us to use this machine; all others they allowed us to use. In fact, they gave us a great deal of assistance in installing our powder plant, but they were not quite as cordial with reference to this machine as we thought they ought to be, so we got up one of our own, and we do not have to pay any royalty at all.

Mr. SHERLEY. Have there been any reductions in small-arms powder—that is, the contract price—comparable to the reductions that have from time to time been made in powder other than small-arms powder?

Gen. CROZIER. Yes; the process of manufacture is identical up to the time that the powder issues from the press.

You may understand that this powder in its first form is a gelatinous mass, and then it is put in a press. It is then given the shape of grains by being forced out of this press through the proper-sized hole and chopped off into proper lengths. Up to the time it is put in this press the process is identical, and it is only after that that it becomes different. The form of the dies through which the powder is pressed out of the press is different for the small-arms powder and the cutting off is different.

Mr. SHERLEY. There have been very marked reductions in the price paid for powder other than small-arms powder in recent years, and I am trying to ascertain whether there have been proportionate reductions in small-arms powder.

Gen. CROZIER. Yes; it has traveled down in price with the other.

Mr. SHERLEY. And yet it has not reached, by 5 cents, as near the point of what it is costing the Government to make it as the other powder has?

Gen. CROZIER. No; it has not.

Mr. SHERLEY. Are there any existing contracts for either kind of powder that look to future deliveries, so as to prevent the readjustment of the price?

Gen. CROZIER. No; we only make our contracts for a year's supply at a time, and that can be reviewed at any time, every year at least; we have no agreement to maintain this price for small-arms powder; it can be overhauled at any time.

Mr. SHERLEY. When are the contracts let—at what time of the year?

Gen. CROZIER. We generally let them along in the early summer, shortly after the passage of these supply bills.

Mr. SHERLEY. Can you put in your hearing, as a note, the exact cost the Government is found to exceed in the making of small-arms powder? You stated you thought it was about 65 cents. As to the other powder, in a previous hearing you have given a detailed statement as to how it was arrived at.

Gen. CROZIER. I can give it to you right now. Would you like to have a detailed statement of the cost of the cannon powder and then a detailed statement of the excess cost; that is, those features that constitute the excess cost of the small-arms powder?

Mr. SHERLEY. I think that would be well.

Gen. CROZIER. I will mention the difference now, as that is a new matter. Now, owing to various causes, waste and others, it requires, on an average, about 6 per cent more of guncotton for a given weight of the small-arms powder than for a similar weight of cannon powder and about three-fourths of a pound more of alcohol, and it is estimated that about one-tenth of a cent a pound should be added to cover the cost of the bags in which the small-arms powder is packed; there are more; it is packed in smaller quantities. Now, the costs for the various operations of the caliber .30 powder are, as I said, the same up to the press house, because the process is the same.

The difference in the cost from that point on is about like this: Pressing it out through dies and dividing it up into grains, the increased cost per pound for the small-arms powder is about \$0.03993; the additional cost of drying is \$0.00672; the cost of blending—that is, mixing various lots together so as to get uniformity—\$0.00159. So that the total cost of labor, in addition to that for the cannon powder, is \$0.04824. Now, the increased cost of the material, due to waste, etc., would average about \$0.0435, making a total for labor and material of about \$0.10174; so that the total increase of cost is just \$0.10174 per pound. Now, if you would add to that 25 per cent for profit, that would make the difference in price about 12½ cents a pound, and the actual difference in price, as charged by the manufacturers, is 15 cents.

Mr. SHERLEY. Are all contracts for the purchase of powder given to one company—is there but one bidder?

Gen. CROZIER. There is but one bidder, and that is the Du Pont Powder Co.

Mr. SHERLEY. Is that true as to powder purchased for the Navy as well as for the Army?

Gen. CROZIER. Yes, sir.

Mr. SHERLEY. Are the contracts for Navy powder let with the Army contracts?

Gen. CROZIER. They are let in accordance with the terms of a common understanding; that is to say, the price of the powder depends on the total amount ordered; it becomes 60 cents a pound if the total ordered by the Navy and the Army reaches a certain amount; so the chief of the Bureau of Ordnance of the Navy and myself get together and arrange how much powder we can order from the private manufacturers.

Mr. SHERLEY. The Navy is also making some of its own powder?

Gen. CROZIER. Yes, sir; at Indian Head, which is about 22 miles down the Potomac River.

Mr. SHERLEY. Do you know what it is costing the Navy to make its powder?

Gen. CROZIER. I do not know.

Mr. SHERLEY. Have there been any figures issued by the Navy Department about that?

Gen. CROZIER. Well, there have been some figures issued, but I have not had a chance to examine them; and figures, unless you examine them very closely, can be very elusive. It is highly necessary to have detailed information of just what is counted in a stated cost; so that I do not really feel competent to say anything about what it is costing them.

Mr. SHERLEY. Do you know whether the cost is under what they are paying for powder purchased from private manufacturers?

Gen. CROZIER. Yes, sir.

Mr. SHERLEY. It is the same powder?

Gen. CROZIER. Yes; the Army and the Navy use the same powder, whether manufactured by themselves or manufactured by private manufacturers.

Mr. SHERLEY. Are there any other commercial concerns, other than the Du Pont powder people, that make the same grade of powder as is used for small arms?

Gen. CROZIER. No; not for military small arms.

Mr. SHERLEY. That is what I mean.

Gen. CROZIER. No.

Mr. SHERLEY. Does that powder differ materially from that used for small arms for sporting purposes?

Gen. CROZIER. Yes; it is much more carefully made and much more expensive. One point in which the difference is greatest is in the main ingredient of the powder, or one of the main ingredients in the powder. Until five years ago we used in our small arms what was known as nitroglycerin powder, instead of the nitrocellulose powder, which we use now. Those terms are a little misleading, because both powders have nitrocellulose in them, which is gun cotton, formed by nitrating ordinary cotton with nitric acid.

Now, in the nitroglycerin powder the guncotton thus formed was dissolved in nitroglycerin in the proportion of something like 75 per cent guncotton and 25 per cent nitroglycerin, with a little acetone added to facilitate the solution. I have not gone into all of the details, but that is the main description. The nitrocellulose powder has nothing in it but guncotton, and this guncotton is dissolved in a mixture of ether and alcohol, ordinary ether and ordinary alcohol, and that makes it into this gelatinous mass that I spoke of, and then it is divided into grains and then the ether and alcohol are, in a large measure, taken off, so there is not much left beside the nitrocellulose, although we put in a little bit of substance which is intended to make the powder more stable, and so it will not be subject to decomposition. Now, the principal difference in the use of those powders is that a very much smaller quantity of the nitroglycerin powder is sufficient for a charge than the nitrocellulose powder, but, on the other hand, the temperature or combustion of the nitroglycerin powder is much higher, it gives out more heat, and the result is to wear out the gun more rapidly, and therefore we were obliged to abandon the nitroglycerin powder for our small arms, since it wore out the muskets in about 2,000 rounds as against about 12,000 or 15,000 which we are getting with the nitrocellulose powder. Now, in sporting powders they largely use nitroglycerin.

Mr. SHERLEY. Do you know whether any testimony was developed in connection with the Government's suit against the Du Pont powder people relative to the agreement that had been entered into by that company with other companies in other countries touching amounts of powder that should be supplied to different nations in case of war?

Gen. CROZIER. I do not know of any; I did not see that testimony; I do not know of any agreement that relates to time of war, but I

believe that there has been something of an agreement in the past as to the field that the different companies in the different countries would endeavor to cultivate, and there has been something like a parceling out of the world. However, there has recently been brought very prominently to our attention that there is a good deal of rivalry. Our manufacturers have quite recently been getting contracts for supplying powder to a South American Government, and I have reason to think that that is not very much liked by European powder manufacturers, and there have appeared in some of the European technical journals attacks upon our powder, which are so ill-founded and advance arguments which are so contrary to the facts that I can not but think that they are inspired by a feeling of resentment that the United States manufacturers are going out of their own country and into the general field of military powders for Governments other than our own.

Mr. SHERLEY. How do our powders compare with those used by other countries and manufactured in other countries?

Gen. CROZIER. We think there are none better, and we think that ours are very much better than some of those which we know of; for instance, we think ours is much better than English powder.

Mr. SHERLEY. Has the Ordnance Department ever bought any powder abroad?

Gen. CROZIER. Oh, yes; we have bought samples quite often, but we have never been obliged to buy any considerable supply of powder abroad. I have, even before the Government had its own powder factory, held myself at liberty to tell our own manufacturers, when any improvement in powder came about on the other side, that they must either come to it or I would purchase powder abroad. There have been several instances in the history of powder making where we have been able, by purchasing samples abroad, to satisfy ourselves that they were in advance of us, and in some cases our manufacturers have said that they had difficulty in importing that method or process of manufacture into this country because the foreign manufacturers wanted an inordinate reward for imparting the necessary information; in that case I have told them that they must find some way of producing it or come to an agreement in some other way or I would have to go abroad for the powder, and that has always been effective.

Mr. SHERLEY. Are the companies that supply powder to the various foreign countries limited in number? In other words, for instance, in England, is there competition among the companies there as to powder purchased by the British Government, or are they confined, as we are, practically to one company?

Gen. CROZIER. I do not think there is competition; I think that the English private manufacturers of powder are pretty closely connected with the German manufacturers, and I do not think there is very much competition. In France the manufacture of powder is a Government monopoly, none being made by private manufacturers; but that is not the case in England, the Government manufactures powder in England at their powder factory at Waltham Abbey, and private manufacturers also make it, but I think that private manufacturers are not in competition with one another.

Mr. SHERLEY. Is there a monopoly in Japan?

Gen. CROZIER. I think Japan is largely supplied from England.

Mr. SHERLEY. You might indicate what proportion of moneys appropriated under this item have been used for the machinery necessary for manufacture, tests, and experiments.

Gen. CROZIER. I have not the figures divided in that way, Mr. Chairman, but the test is not a very considerable item, although, of course, it does amount to something. We are all the time trying to make the time fuses burn more regularly and to increase the length of time during which they will burn; and, of course, in connection with that manufacture there is quite a good deal of testing. We manufacture the fuses and send them down to the Sandy Hook Proving Ground and they test them there. Similarly, we test new designs for shrapnel, in the making of which we have had some trouble in the past; we have also been changing the explosive material which we put in the shrapnel in order to burst it when it gets to the end of its flight; we have been experimenting some with that, all of which experiments require tests, but I do not think the tests and the machinery would amount to 10 per cent of the total appropriation.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR SEACOAST CANNON.

Mr. SHERLEY. The next item is "For the purchase, manufacture, and test of ammunition for seacoast cannon, including the necessary experiments in connection therewith and the machinery necessary for its manufacture at the arsenals." That also is reserve ammunition?

Gen. CROZIER. Yes; that is reserve ammunition entirely.

Mr. SHERLEY. You are asking this year for \$140,000, which is the same amount appropriated for the past two years?

Gen. CROZIER. Yes.

Mr. SHERLEY. What is the condition as to the percentage of reserve ammunition that we now have for seacoast cannon?

Gen. CROZIER. It is about 70 per cent of the allowance which we consider necessary.

Mr. SHERLEY. What is the allowance?

Gen. CROZIER. The value of the allowance for the guns which have been provided for in continental United States up to the present time is \$16,600,000; that is the value of it, and we have about 70 per cent of that; of course, the value of the allowance for all the cannon which are included in the plans which have been submitted to you for the complete defense of the seacoast of the United States is much greater—\$19,117,000—and we have about 60 per cent of that.

Mr. SHERLEY. The amount of reserve is estimated to be an amount sufficient to last the guns for an hour's continuous firing?

Gen. CROZIER. That is one way of stating it. The way in which I usually state it is that it is sufficient to last over two hours of continuous fighting for half the guns, because we do not expect all of our coast to be assaulted at the same time; it amounts to the same thing, however. In addition to that, some of the guns have a little extra allowance which has been added to them. Recently we have developed one or two kinds of projectile which we have not used before, being one for a 12-inch mortar, which weighs 700 pounds as against the lightest one we used before, which was something over 800 pounds. The object in developing this 700-pound projectile and using it was

to increase the range without having to build larger and heavier mortars, the increased range seeming to be desirable for some places, and we have increased the range, due to the use of this lighter projectile, for the long ranges only from 12,000 to 15,000 yards. Now, there is another modification for some of our possessions, particularly for the insular possessions; this does not apply so much to the United States, but in the Philippines, for instance, we have at the mouth of Manila Bay and at the mouth of Subic Bay some mortars which would be useful in rendering the neighboring land uncomfortable for occupation by an enemy, and we have devised for these 12-inch mortars a shrapnel which we can fire over there, and which will explode in the air and distribute half a bushel or more of bullets around in the neighborhood of an enemy.

Mr. SHERLEY. You are not asking this year, General, anything for armament in the way of seacoast cannon.

Gen. CROZIER. No; not for the continental United States.

Mr. SHERLEY. Now, will there be any armament mounted and, therefore, in a condition to be used, within the next year, in the United States?

Gen. CROZIER. Any new armament?

Mr. SHERLEY. Yes.

Gen. CROZIER. I do not remember any.

Mr. SHERLEY. The purpose of these questions was to develop whether, in arriving at the percentage of reserve that now exists, any additional amount of armament would have to be figured in?

Gen. CROZIER. Not in the immediate future; no, sir.

Mr. SHERLEY. Now, the allowance of this item would bring your percentage of reserve ammunition up to what figure?

Gen. CROZIER. After this appropriation is made?

Mr. SHERLEY. Yes.

Gen. CROZIER. The percentage is pretty small. I think it would increase it less than 1 per cent; that is, from 70 per cent it would go up to something between 70 and 71 per cent; it would not quite reach 71 per cent.

Mr. SHERLEY. What is the condition of the Treasury balance under this item?

Gen. CROZIER. There was in the Treasury on January 15, \$226,670.55; there was due the arsenals for work which they had in hand, \$137,616.76; and there was needed to meet the obligations of outstanding contracts \$65,000, leaving an unobligated balance of \$24,433.79.

Mr. SHERLEY. Have you the total of expenditures that have been made for this reserve for seacoast cannon in the United States?

Gen. CROZIER. The total that has been appropriated is about \$14,833,000; that is, very close to it.

Mr. SHERLEY. And how much is it estimated will be needed to entirely supply the reserve?

Gen. CROZIER. For the total scheme of fortification there will be needed \$7,750,000 worth in addition.

Mr. SHERLEY. There has been no change as to the quantity that was desirable for reserve?

Gen. CROZIER. Just with the little exception that I gave you a moment ago; that is all the change. I ought to say, Mr. Chairman, in explaining to you the scheme under which we arrive at this reserve,

that it includes not only this ammunition for two years' practice for one-half of the guns that we have mounted along the coast, but also includes a reserve for target practice; that is to say, upon the outbreak of war we would immediately recruit up the Regular Army and the Coast Artillery companies to their war strength and then we would give them what would amount to a year's target practice right away. They would have it as soon as they could get their recruits in, and we would give the militia which we would call to the service at that time two years' target practice, the amount of target practice calling for two years' allowance; and then the following year we would go on with the regular target practice, so that the amount of ammunition necessary to conduct this practice has been included in the sums which I have given you in addition to that which is necessary for two years' action for half the guns.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, ETC., FOR SEACOAST ARTILLERY PRACTICE.

Mr. SHERLEY. The next item is "For the purchase, manufacture, and test of ammunition, subcaliber guns, and other accessories for seacoast artillery practice, including the machinery necessary for their manufacture at the arsenals." You ask the same amount as last year, \$425,000, which is also the amount that was appropriated last year?

Gen. CROZIER. Yes, sir. I may say, in regard to that, that it covers the target practice of the Artillery troops which are in the insular possessions as well as those in the United States. For the reserve ammunition and the armament we make a separate provision for the insular possessions, but with reference to target practice, since it is all done by the same organizations, we do not separate it.

Mr. GOOD. General, where do you manufacture the powder that is manufactured by the Government?

Gen. CROZIER. At the Picatinny Arsenal, near Dover, N. J.

Mr. GOOD. What percentage of the powder that the Government purchases, provided for in these three items, is purchased and what percentage manufactured?

Gen. CROZIER. Taking all the items which cover the procurement of powder, we, during the last year, purchased about three times as much as we manufactured.

Mr. GOOD. You have reference now to the Army?

Gen. CROZIER. The Army alone.

Mr. GOOD. What is the Government's investment in the powder plant at that arsenal?

Gen. CROZIER. In the plant proper, consisting of the land, with the expense of putting it in condition, building roads, etc., the buildings, including the power house, storehouse, and factory buildings, machinery of all kinds, including that for power and for the manufacture of powder itself, the investment amounts to \$514,125. Now, in the manufacture of the powder itself there is to be included and is included in my estimate of cost, when I give the overhead charges, an investment in material for current use; for instance, a good deal of powder goes into the drying house and stays for six months and the value of it is locked up, and for an output such as we are making now the value of that investment is about \$124,000, so that for our present

output the total investment, including plant and material passing through the process of manufacture, is \$638,125.

Mr. GOOD. Have you been running these plants at their full capacity, or to what extent?

Gen. CROZIER. No; our plant is only running at about one-third of its capacity or a little more than that; it is running at less than one-half of its eight-hour capacity. The capacity is about 9,000 pounds per day of three shifts, 24 hours, and one-third of that would be 3,000 pounds per day of 8 hours, and we are running it at about 1,250 pounds per day of 8 hours.

Mr. GOOD. Have you any data with regard to the relative cost of manufacturing powder in this country and in the Republic of France, where it is manufactured by the Government?

Gen. CROZIER. I have not, and I do not think there are any data on that subject, because, as I say, the Government of France manufactures all of its powder and all of the powder factories are owned by the Government.

Mr. SHERLEY. Do you know what England pays for its powder?

Gen. CROZIER. No; I do not. I only know that on those occasions when we have bought powder from English manufacturers or German manufacturers we have not been able to get it at any less price than we paid over here. The claim is made by our American manufacturers that all of the foreign Governments pay their manufacturers more than our Government pays them; I do not know whether that is so or not.

Mr. RAUCH. When you have made an inquiry as to prices abroad, have the quotations been about the same as by manufacturers in this country?

Gen. CROZIER. That is my recollection. I do not think I have bought any powder abroad for five years, so that my recollection is a little hazy.

ALTERATION AND MAINTENANCE OF THE MOBILE ARTILLERY.

Mr. SHERLEY. The next item is "For the alteration and maintenance of the mobile artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work and the expenses of the mechanics engaged thereon." You ask this year, as you did last, for \$45,000?

Gen. CROZIER. Yes, sir. That is estimated to care for it—keep it in good order—and for the application of all modern improvements that may come up as we go along, in order to keep it up, both that which is in use and that which is in reserve. It applies to matériel of about \$8,000,000 in value.

Mr. SHERLEY. And the alteration, I presume, is very slight?

Gen. CROZIER. When we make an improvement we wish to put it on everything—on both that which is in use and that which is in reserve. The total amount of this is just over half of 1 per cent of the value of the matériel which it applies to.

Mr. SHERLEY. What would you say as to the expense of maintenance of ordnance as compared with emplacements and engineering work generally?

Gen. CROZIER. So far as the maintenance alone is concerned, the maintenance and repair of ordnance matériel is more like that of

machinery. We have more machinery than the emplacements contain, and, therefore, I should say that the cost of upkeep with us ought to be greater. The emplacements are mostly of masonry work, and I do not think they ought to require very much in the way of repairs. The emplacements, however, contain a certain amount of mechanism which is not supplied by the Ordnance Department, particularly the mechanism of the ammunition hoists, and that is subject to the same kind of wear and breakage that our matériel is. The percentage of cost for maintenance ought not to be very different for that, but when it comes to alteration, that is a different thing; it depends altogether upon the improvements that are made. It is hard to compare it and it is hard to say what the alteration will amount to in a year.

Mr. SHERLEY. How about structures, buildings, etc., for mines and mine equipment—the upkeep of such equipment?

Gen. CROZIER. In that there is not anything, or scarcely anything, that is comparable to the material which we have; they have storehouses, they have tanks—water tanks—in which they store their submarine cables, or used to have; they have certain electrical machinery and appliances, which I venture to say require some expense for maintenance, but it is nearly all under shelter, whereas a good deal of our material stands out in the open.

Mr. SHERLEY. Speaking broadly, then, you would think that your maintenance charge would run in excess of theirs?

Gen. CROZIER. I should think it would. Mechanical objects exposed are more subject to deterioration than structural affairs which are not exposed.

Mr. SHERLEY. The note to this estimate states the particular batteries that are to be maintained by this fund—that is correct, is it, General?

Gen. CROZIER. I think that is about correct; there may be one or two very slight changes that have taken place, due to the cost of manufacture since that note was written.

Maj. RICE. This includes batteries that we expect to be completed by June, 1912.

**PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, SUBCALIBER GUNS
FOR MOUNTAIN, FIELD, AND SIEGE ARTILLERY PRACTICE.**

Mr. SHERLEY. The next item is, "For the purchase, manufacture, and test of ammunition, subcaliber guns, and other accessories for mountain, field, and siege artillery practice, including the machinery necessary for their manufacture at the arsenals." You ask for \$130,000. This is practice ammunition?

Gen. CROZIER. That is for the regular service and is intended to cover the target practice and instruction of the 36 batteries in the regular service, and also an amount for practice which is not exactly like ordinary target practice, but which is instructional practice at the School of Fire for Field Artillery at Fort Sill, Okla. That is a new institution and it is intended to develop the science of artillery gunnery—field artillery gunnery. I have made an increase in the estimate over the estimate for last year to provide for this last element that I have mentioned, the school of fire, which is a new institution.

Mr. SHERLEY. Reverting to the item that we have just passed, what is the state of the Treasury balance as to that?

Gen. CROZIER. The balance on January 4 in the Treasury was \$49,077.42, of which there was due to the arsenals for work which they had in hand \$23,318.63, and an unallotted balance in the Treasury of \$25,258.79. There are no outstanding contracts.

Mr. SHERLEY. Is it anticipated that that unallotted balance will be used for the current year?

Gen. CROZIER. Yes; for the remainder of the current year, lasting until the 1st of next July.

Mr. SHERLEY. That is no greater than the usual demands for that length of time?

Gen. CROZIER. No. You see, it is approximately half of the appropriation, and we like to have more than half of the appropriation left when the year is half over, to provide for contingencies.

Mr. SHERLEY. What is the condition of the Treasury balances as to this item that we are now considering—the item for practice ammunition?

Gen. CROZIER. On January 15 the balance in the Treasury was \$96,657.91, and there was due to the arsenals for work which they had in hand \$93,208.95, and due to meet obligations of contracts outstanding \$405, leaving an unobligated balance of \$3,043.96.

Mr. SHERLEY. You think this \$20,000 additional that you are asking is necessary for this new school of field artillery?

Gen. CROZIER. I think it is, Mr. Chairman. The subject of field artillery practice is a very interesting one; the methods of fire which are developed have an interest peculiar to themselves in addition to that which accompanies ordinary target practice. You see, there is not only a desire to hit a target, but there is an effect to be obtained in another way. For instance, the most important fire which is conducted by field artillery is shrapnel fire; the shrapnel must not only be directed properly at the object aimed at, but so directed as to burst at the proper distance in front of and above that object, so that in estimating the results of that fire there is not the usual observation simply to see where the projectile strikes, but an observation made to see where the projectile bursts in the air, and the utilization of that bursting to correct the aim. It is really a very delicate matter, and to do it in such a way as not to waste ammunition and properly search the ground that is intended to be searched requires not only a good deal of practice, but it requires a good deal of careful examination to find out what the best methods are. This school establishes the methods for the rest of the service, and the service is supposed to follow those methods.

Mr. SHERLEY. Do you anticipate that this will be a continuing item?

Gen. CROZIER. I think it will; yes.

Mr. SHERLEY. And \$20,000 is the least sum to maintain that practice there?

Gen. CROZIER. I think that is as little as ought to be assigned to it. You see, in addition to developing the fire in this way, the officers, who are the instructors, have to receive their instructions at this school first, and then they go back to their batteries and instruct their batteries, and for that they use the \$110,000 worth of target-

practice ammunition, which is also provided for in this appropriation.

Mr. SHERLEY. Is this a new post or simply a new school established at this post in Oklahoma?

Gen. CROZIER. It is an old post, but it has been recently added to. It might be better for me to say it is an old station. The post has had a large addition made to it.

Mr. SHERLEY. Recently?

Gen. CROZIER. Yes; recently. I do not think that the addition was made with reference to this school. It was made with reference to the stationing of troops, and the plan was a short time ago, although it was not definitely and ultimately worked out, to use the old post for the school—the older part of the post.

Mr. SHERLEY. That is hardly in harmony with the plan of abolishing a lot of these posts, is it?

Gen. CROZIER. No; what has been done there is not in harmony with that plan, except that it is a step in consolidation. The Government there has a large reservation; and, in reducing the number of posts, that is one of the places where a post would be expected to be kept.

ALTERATION OF 3 $\frac{1}{2}$ -INCH BATTERIES.

Mr. SHERLEY. The next item is "For the alteration of 3 $\frac{1}{2}$ -inch batteries to rapid-fire field batteries, including sights, implements, equipments, and the materials and machinery necessary for alteration and manufacture at the arsenals." You are asking for \$103,000, and the footnote says, "Estimated for the conversion of three 3 $\frac{1}{2}$ -inch batteries to 3-inch."

Gen. CROZIER. At \$34,333.33 each. Now, for that sum we will obtain batteries of which the guns and gun carriages are identical with our latest material, but the limbers and caissons are converted from the old.

Mr. SHERLEY. How many of these batteries that it is expected to alter exist now?

Gen. CROZIER. The total number which we expect to convert in this way will be 44 batteries.

Mr. SHERLEY. Including these three?

Gen. CROZIER. And of those 44 batteries 18 have already been provided for, so that the 44 include these 3 and the 18 do not. So if we get this appropriation of \$103,000 annually it will take between eight and nine years for the completion of the conversion of the batteries which we already have on hand.

Mr. SHERLEY. Is there any advantage in making a conversion of these batteries more rapidly and thereby lessening the number of new batteries to be appropriated for?

Gen. CROZIER. No, Mr. Chairman; although that, by looking at it at first sight, would seem to be the case. These, of course, can only be converted into 3-inch-gun batteries, and while the 3-inch gun is the most useful gun, we happen to have gotten together a larger supply of this gun than any of the others. What we are anxious to get are guns of other calibers than the 3-inch gun.

Mr. SHERLEY. Then, your estimate for mobile matériel had in contemplation guns other than the 3-inch gun?

Gen. CROZIER. Yes; from that appropriation I did not expect to get any 3-inch batteries at all; I expected to get 10 batteries, of which three would be 3-inch mountain howitzers, four 3.8-inch mountain howitzers, and three 4.7-inch mountain howitzers, so that the only 3-inch batteries added to this reserve supply on hand are these converted batteries.

Mr. SHERLEY. Last year we gave you \$200,000, and that provided for how many conversions?

Gen. CROZIER. That would provide for approximately twice as many. As a matter of fact, we did use it for five, and if we continued at that rate we would get all of these batteries converted in about four and a half years; the total cost of the conversion would be about \$900,000. Shall I give the condition of the balance in the Treasury?

Mr. SHERLEY. Yes.

Gen. CROZIER. On January 5, \$132,559.78, of which there was due to the arsenals for work which they had in hand \$83,486.60, and to meet obligations of outstanding contracts \$2,928.03; so that there is an unallotted balance of \$46,145.15.

Mr. SHERLEY. Now, if this total amount is given to you this year, would the entire sum be expended, or is this like other cases where part of the money would not be needed until after March of next year?

Gen. CROZIER. We do all of this work in our own arsenals, and, therefore, I think we ought to provide for this money being expended in the next fiscal year. Of course, if we found that we were reaching the limit of the capacity of the Rock Island Arsenal, we would give a larger amount of the work out at contract, but that would not include any of this work; it would be the manufacture of new material; conversion and repair work is not advantageously done under contract. So I think we would do all of this, and I think we could get most of it through. It might be that it could be cut down 25 per cent if I were authorized to embark on it all, but that would be such a small matter that I think it would not be worth while to complicate the accounting. You see that in the other appropriation for field artillery, pertaining to new batteries, I suggested that you might cut the appropriation in half, cut it down \$500,000; but cutting this 25 per cent would amount only to \$25,000, so it would scarcely be worth endeavoring to put it through after that method.

ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY.

Mr. SHERLEY. The next item is "For the alteration and maintenance of seacoast artillery, including the purchase and manufacture of machinery, tools, materials necessary for the work, and expenses of civilian mechanics and extra-duty pay of enlisted men engaged thereon." You estimate \$300,000, which is the same estimate as last year and the amount of the appropriation in last year's bill?

Gen. CROZIER. Yes, sir; it is intended to maintain all the seacoast armament, but not to do very much alteration. I could do upon the seacoast armament, as it is now installed, between \$2,000,000 and \$3,000,000 worth of alteration if I were to put all the new improve-

ments on all the armament we have. I think, however, that the seacoast artillery is in such fairly good condition for defense, as compared with our other necessities, that we can get along all right without bringing it all up to date; therefore I am simply asking for enough for the maintenance and for minor alteration. I have got a long list here of items of alteration that might be attended to, but it is not imperative and not as pressing as other things.

Mr. SHERLEY. I notice in the note the statement that "The annual maintenance of the entire material costs approximately \$170,000." That would indicate \$130,000 in the way of alteration or modernizing.

Gen. CROZIER. Yes, sir; which is not 10 per cent of the alteration that I would do if the question of funds were not an important one.

Mr. SHERLEY. What is the condition of the Treasury balances under this item?

Gen. CROZIER. On January 4 there was in the Treasury \$387,081.80, and there was due the arsenals \$230,046.71, leaving an unallotted balance of \$157,035.09, which is for the maintenance of the Seacoast Artillery during the remainder of the present year, which is only half over, and for the alteration of certain fire mechanisms to increase their safety, which we have underway now, and for contingencies. Of course, we never know when there may be breaks and things of that sort, so we like to keep something in reserve until the end and then rush the expenditures for things we know we want to do.

Mr. SHERLEY. You will be able to get along on \$300,000?

Gen. CROZIER. Yes.

Mr. SHERLEY. That was a cut of \$70,000 over the year previous and \$125,000 over the year previous to that?

Gen. CROZIER. Yes, sir; but that means we did less modernizing and altering, and that we let the material slip a little farther back, in the sense that we have not kept it up to date.

Mr. SHERLEY. But that does not mean depreciation in any other sense at all?

Gen. CROZIER. It does not mean it is getting any worse or that we are allowing it to run down at all; it simply means that we are putting on new improvements to a less degree, but not allowing it to deteriorate. I think I can say with some satisfaction that from the beginning of the reestablishment of the coast defenses in the United States in 1888 we have not thrown any material in the scrap heap because of its being obsolete, except some dynamite guns, which were, I will not say presented to us, but for which we did not make an estimate; they were appropriated for without an estimate on the part of the department.

PROVING GROUND, SANDY HOOK, N. J.

CURRENT EXPENSES.

Mr. SHERLEY. The next item is, General, "For current expenses of the ordnance proving ground, Sandy Hook, N. J., comprising the maintenance of rail and water transportation, repairs, alterations, accessories, and service of employees incidental to testing and proving ordnance material, hire of assistants for the Ordnance Board, purchase of instruments and articles required in testing and experi-

mental work, building and repairing butts and targets, clearing and grading ranges." You ask for \$56,200, that being the same amount that has been estimated and appropriated for several years past?

Gen. CROZIER. Yes, sir; and really for a longer term of years than appears from the list of appropriations, because back in 1909 or 1910, when there was an apparent increase in the appropriation, the increase was only apparent because it resulted from a consolidation and not from an addition; another appropriation was omitted altogether.

Mr. SHERLEY. That was in connection with transportation, was it not?

Gen. CROZIER. Yes, sir; and which is now appropriated for in this appropriation bill; so that that has not changed for a long time. There is one item of that which I would like to explain, if the committee is interested, because I think a number of the members of the committee have not heard it before; but I see that has reference to the next appropriation. We have nothing special to say about this item.

Mr. SHERLEY. General, has anything been done by the Ordnance Department, or any other branch of the service, looking to further tests of the effect of explosives that are shot in projectiles not intended to penetrate, but simply to explode on the outer surface of the armor or target?

Gen. CROZIER. Nothing has been recently done by the Ordnance Department; no.

Mr. SHERLEY. You remember that last year the hearings contained some testimony touching the experiments that were had at the instance of Mr. Isham, I believe, who was the patentee of a certain projectile?

Gen. CROZIER. Yes.

Mr. SHERLEY. Nothing has been done, then, toward a further investigation of his claims one way or the other?

Gen. CROZIER. No; not by this department.

Mr. SHERLEY. And your own conclusions, as previously expressed, have not been changed?

Gen. CROZIER. I have not changed my mind on that at all. I think that in order to secure much effect from a projectile fired against armor plate you need some penetration.

Mr. SHERLEY. General, assuming that provision was made for fortifying the lower Chesapeake, how much land do you think it would be desirable for the Government to have there? I should like to have your opinion.

Gen. CROZIER. Really, Mr. Sherley, I could not give an opinion on that because I have not looked into it. That would involve the extent to which such guns as we would put there would be scattered; that is, the distance apart; and it would also involve the distance one would have to go from the battery before finding a suitable place to establish quarters and stables and storehouses, which could only be established after examining the ground, which examination I have not made. So I could not give a good opinion.

Mr. SHERLEY. Assuming no permanent barracks for the quartering of troops was desired, or judging by other places, how much would ordinarily be necessary simply for the guns and the fire control, and things that were necessary for the operation of them?

Gen. CROZIER. Well, there again, as I say, if they were all in one battery, right together, it would not take very much; but we have usually tried to scatter the guns a little bit so as not to make a concentrated target for the enemy. But I should say that batteries alone could be put on 40 or 50 acres and leave reasonable distance around them so that casual people could not get right up close to them.

Mr. SHERLEY. There would certainly be no need of an acreage amounting to 300 acres if you did not want to establish a post there, would there?

Gen. CROZIER. No; there would not, I should say.

Mr. SHERLEY. General, what do you think as to the advisability of fortifying the lower Chesapeake at that point?

Gen. CROZIER. I think the mouth of the Chesapeake Bay ought to be closed if it can be done with any reasonable expense, because it is a large body of sheltered water and it would afford a resting place for exactly the same kind of an operation that was successful here in 1814. I do not see if one or two powers of Europe should conceive that they had occasion to make a bold stroke against us that there would be anything impracticable in their capturing this capital again.

Mr. SHERLEY. Assuming they had command of the sea?

Gen. CROZIER. Yes; assuming they had command of the sea. A hundred thousand troops would do it with a large margin to spare. A hundred thousand troops could be gotten over here and into Chesapeake Bay and be landed up here at Annapolis or up in the same river that they landed before—the Patuxent—the mouth of which is not fortified, and by which they could land within a short distance of Washington and march overland. Annapolis would also be a very good place for them to land.

Mr. SHERLEY. Would fortification of the lower Chesapeake prevent the landing of a force 8 or 10 miles away from it, just outside the range of the guns?

Gen. CROZIER. Yes; because then they would have no harbor; they would have to use the open sea, and landing operations are very difficult on the open sea. They could not get a resting place on shore; whereas if they once get into the Chesapeake Bay they could find any number of very good resting places, if they had command of the sea, which they could make temporary bases of operations. As far as the sea is concerned, as a highway it is not an obstacle, but a facility. It is very much easier to get any number of troops across the Atlantic Ocean than it would be to get the same number over anything like the same distance on land.

Mr. SHERLEY. Assuming the troops were landed, do you think that with our present condition of mobile-Army defense, that they could hope to reach Washington?

Gen. CROZIER. I think that Washington could be captured within a month if any power or combination of powers of Europe which had the command of the sea should think it worth while to try it. I am not an alarmist. I do not think they are going to try it, but where is the difficulty, Mr. Chairman? They have the Atlantic Ocean as a splendid highway. Marine transportation is the very best kind of transportation that you can have, the easiest and least expensive, and the most expeditious, if you are considering large bodies of troops with large amounts of material. The fuel charge

for water transportation in good tramp steamers does not amount to one-two hundred and fiftieth part of a cent per ton per mile. One can not help but be impressed in our own distant possessions with the tremendous amount of people, and forage, and food, and clothing, and blankets, and harness, and wagons, and everything of that sort, which can come out of the inside of a vessel of very moderate tonnage—2,000 or 3,000 or 4,000 tons. It is a splendid means of transportation, and the distance is only 10 days for a vessel of very moderate speed, and you can carry a thousand men on a vessel of 3,000 tons capacity without any trouble at all. There are any number of vessels in existence to be had, and there is no resistance on this side against a well-equipped force of a hundred thousand men.

Mr. RAUCH. In your opinion, what range gun would be required to close the mouth of the Chesapeake?

Gen. CROZIER. I think our 14-inch gun, which is good for the penetration of 12 inches of armor at about 13,000 yards, would do very well. It would not need any larger guns down there, and I think three or four or a half dozen of them would be sufficient, and a few mortars. We have a 12-inch mortar of which the extreme range, with the 700-pound projectile of which I was speaking to the committee awhile ago, is about 15,000 yards. The increase from the range which we have with the use of the 824-pound projectile, which was the lightest one that we had been using formerly, is from 12,000 to 15,000 yards. The 14-inch gun, of which I was just speaking to you as being able to penetrate 12 inches of the best armor to be had at 13,500 yards, has an extreme range of about 18,000 yards at the elevation which can be given it on the carriage as we mount it. Of course it can be pointed up in the air at an angle of 40 or 45°, and it would then have a much greater range.

Mr. RAUCH. With the present development of the science of fire control, could those guns be operated in the night as well as the day?

Gen. CROZIER. Not as well as in the day, Mr. Rauch. We have a pretty efficient system of searchlights and we are using a little affair called a "tracer" on the base of the shell, which we have had more or less success with, which will burn and show the flight of the shell, so that we are not helpless; but of course the practice is not nearly as good as it is in the daytime.

NECESSARY EXPENSES OF DETAILED OFFICERS.

Mr. SHERLEY. The next item, General, is for the necessary expenses of officers while temporarily employed on ordnance duties at the proving ground and absent from their proper stations at the rate of \$2.50 per diem while so employed, and the compensation of draftsmen while employed at the Army Ordnance Bureau on ordnance construction.

You have been asking for a number of years previous \$18,700?

Gen. CROZIER. Yes, sir.

Mr. SHERLEY. What is the condition of the Treasury balance that may be there?

Gen. CROZIER. I have not that balance. It amounts to very little, and it is used up regularly every year, pretty nearly that. I expect to use of that \$11,700 for draftsmen and \$7,000 for the other item,

expenses for the officers at the proving ground. As I say, that is an annual appropriation which just about lasts out the year.

In regard to that I would like to make an explanation of the expenses of officers at the proving ground. I do not think I have made one before this committee for a long time.

Mr. SHERLEY. We would be very glad to have it.

Gen. CROZIER. The Sandy Hook Proving Ground is very different from any other post in the Army in one respect. The department has no quarters there for its officers, and all the officers on duty there, while they are there, are housed in one large house which the Government owns, with the exception of some four officers who have borrowed quarters from the neighboring Artillery post of Fort Hancock, because that post has not its full complement of officers, and these quarters can be used; but they are likely to have to give them up at any time. Officers who are in this one large house and who have no quarters there are all stationed, by order, in New York; but they spend practically the whole week at Sandy Hook, and then go up to New York at the end of the week; or they may have rented houses somewhere else than New York, in some of the neighboring suburbs. Their families are maintained away from Sandy Hook. Two of them have quarters on Governors Island, and their families are there. The proving ground is a permanent place. We would need the proving ground even if we were to abandon the arsenals, because we would have to have some place to test the guns, ammunition, projectiles, and armor plates that we would buy, even if we did not make any of them ourselves. So it is as permanent a place as we have.

Therefore, a question might very naturally arise as to why we do not do there as we do elsewhere, and secure appropriations for and build quarters for these officers and for the families of such of them as have families. The answer to that is that the Sandy Hook Proving Ground is the most instructive place that we have, and we are impressed with the value in the education of an officer for his profession, or of anybody else for that matter, of professional conversation; so that we consider it worth while to have these officers down there all together in one place, where they sit down at one table every day and hear nothing but ordnance. It is ordnance for breakfast, it is ordnance for lunch, it is ordnance for dinner—everybody talking about tests and experiments they have been carrying on, new things that have been coming on, speculations as to what might be, and so forth. I send as many as I can of the officers who come newly into the department each year to Sandy Hook for their first station, and keep them there two years, and we maintain there a school of theoretical instruction, with some practical instruction added, with an officer and his assistant, who, in addition to their other duties, instruct these young officers and teach them to use the knowledge of mechanics and chemistry which they have acquired in their student courses, in application to the design of material which the Ordnance Department has to produce.

I consider that station and that mode of life as exceedingly valuable for these young men, and therefore I prefer to have them down there without any quarters and thrown together in this house. While down there, since they have to maintain their families elsewhere, those who have them, and those who do not have them having to maintain some sort of quarters of their own elsewhere, they are

paid \$2.50 a day for their expenses, which \$2.50 they never see, but it is turned into a common fund and disbursed for the maintenance of the house, and covers their quarters and lodging and subsistence. Anything else in the way of greater indulgence is provided by a kind of a club there—cigars and anything of that sort, which they have to pay for out of their own pockets. Another thing is that there is no public place of lodging at the proving ground. We are having people go down there all the time who have business with the Government—men who have inventions under trial, which they are submitting; contractors who have projectiles, or armor plate, or explosives, or what not undergoing trial.

It is very convenient and desirable to have a place where these people can go and get their luncheon, as they nearly always have to spend the day down there. It would be rather a burden on any officer to have to take them to his own home—people coming as a matter of business. This house is available for that purpose, and oftentimes officers are sent down there for inspection or the examination of new material, to investigate the difficulties that may have been developed in the trial of material which has been designed here in Washington and manufactured at one of these arsenals, and sent there for trial. There is a place for them to go. The officers, who, as I say, have borrowed vacant quarters from the post at Fort Hancock do not draw commutation quarters, as they do not have to provide themselves with quarters elsewhere, and I do not require them to take all their meals at this common house, but I do require them to take a certain number of them, and they are paid and turn directly in to the treasurer a certain percentage of this \$2.50 a day which is allowed to the officers who regularly stop at the house and take all their meals there and lodge there. As I said a moment ago, I consider that one of the most valuable features of the Ordnance Department—one of the most valuable educational features. Although some of the officers would be more comfortable, and they would like it better and their families would like it better, if we should build quarters down there and let them live in the regular way, I do not think it would be a good thing, and I prefer the present arrangements.

Mr. SHERLEY. That completes, General, the items in continental United States, for the Ordnance Department, as I recall.

Gen. CROZIER. I think that is all in continental United States, Mr. Chairman.

FOR THE PURCHASE, MANUFACTURE, AND TEST OF SEACOAST CANNON,
INSULAR POSSESSIONS—PEARL HARBOR, HAWAIIAN ISLANDS.

Mr. SHERLEY. The next item that you are interested in is found on page 24 of the bill, for the purchase, manufacture, and test of seacoast cannon for coast defenses, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals, \$83,600.

Gen. CROZIER. There is a little mistake in that estimate, Mr. Chairman. It is intended to provide for the defenses of Pearl Harbor two 6-inch guns, with their carriages, and two 15-pounder guns, with their carriages; but the cost of the 6-inch gun and carriages should

be \$27,500 instead of \$33,600 each, which figure I used in making up the estimates, so that the total estimate should be reduced from \$83,600 to \$71,400.

Mr. SHERLEY. That is the only estimate for ordnance in the insular possessions?

Gen. CROZIER. In the insular possessions; there is none for the Philippines.

Mr. SHERLEY. Has provision heretofore been made for all other ordnance contemplated as necessary in the insular possessions?

Gen. CROZIER. Well, no; but all of those which we consider of very great importance. For instance, there are some fortifications contemplated at the island of Guam, but I am not making any estimate for that purpose now, because it is not considered pressing; also some fortifications contemplated in San Juan, Porto Rico, and some for Guantanamo, Cuba, and some on Kiska Island, in Alaska; but none of those are considered sufficiently pressing to estimate for at the present time, in comparison with other matters which are more urgent.

Mr. SHERLEY. What is the condition of the Treasury balance under this item, General?

Gen. CROZIER. On January 4 there was in the Treasury, \$581,608.85; there was due the arsenals for work in hand, \$349,070.04; and needed to meet the obligations of outstanding contracts, \$110,329.95; leaving in the Treasury an unallotted balance of \$122,208.86. Of this unallotted balance \$25,000 will be needed to make some payments to a private company, under a contract, under which we have increased the expense since the contract was made, so that some money will be needed to meet that, and the remainder, \$97,000, is for contingencies. We are embarked in a rather important undertaking over there, fortifying El Fraile Island, upon which we are intending to put two turrets, with four 14-inch guns in them, and four 6-inch guns. We have never built any turrets before. We think we are coming out all right within the appropriation, but we would like to have that margin. So far as we have gotten, we think that our estimates will not be exceeded.

Mr. SHERLEY. You think, then, that there will be a balance of some \$91,000?

Gen. CROZIER. When we get through?

Mr. SHERLEY. When you get through.

Gen. CROZIER. There are some other orders that are involved. The sum total of them will be over \$1,000,000, and we would like to have this as a margin; some of it may be left over. It might all be left over—I do not think that, however.

Mr. SHERLEY. You think you should have \$71,400 prior to March 4 next for this work?

Gen. CROZIER. We would put those 6-inch guns and 15-pounder guns in hand right away, and for that purpose we would need this money. There are only four guns altogether, so I think we would be well along with their construction by the 4th of next March. We will build all of that material ourselves probably, the gun carriages at the Watertown Arsenal and the guns at the Watervliet Arsenal, so that there will be no contracts running a long time, which we will not have to meet the obligations of.

Mr. SHERLEY. You think it is essential to have as much as \$91,000 as a reserve on other ordnance contracts?

Gen. CROZIER. It is a pretty small reserve of the total amount we have got outstanding; it is not all contract work, you know, and it amounts to considerably less than 10 per cent of the amount which we have involved in the work—amounts to less than 7 per cent.

Mr. SHERLEY. The committee has such a high opinion of your accuracy in estimates, General, that perhaps that may have something to do with their doubt of the need of additional reserves.

Gen. CROZIER. I think it would not be safe, Mr. Chairman, to come down any lower than that. Of course, since it is a reserve, I can not say that the absolute need for it is demonstrated, or it would not be a reserve, but it is a very small reserve.

Mr. SHERLEY. Has there been any change of any substantial nature in the character of the armament that is to go to El Fraile?

Gen. CROZIER. Not since I was last before the committee. It is to be four 14-inch guns mounted in turrets and four 6-inch guns; and, as far as the Ordnance Department is concerned, there has already been appropriated all the money which we need, and the work is in progress. I am afraid it will be a little behind time. The turrets are coming along rather slowly. As far as the present need of that \$71,400 is concerned, I would not say that I need it now, if we were sure we were going to get it, because these turrets will be behind time, and some of the payments that would be due on turrets would not have to be met as soon as I had contemplated.

There is a special appropriation for the turrets, so that would not be usable for the purposes for which this \$71,400 is needed, but I have some other appropriations in connection with the turrets which cover about the same general subject, and if the expenditure of this \$71,000 and something over for the purpose for which I ask is authorized, I do not need the money this year.

Mr. SHERLEY. There is no authorization required to enable you to build guns?

Gen. CROZIER. Not if I had the money—not if I was sure of the money. The money which I have had previously appropriated is available for that, but I have not got enough of it. I have only that little margin and I do not want to mortgage that.

Mr. SHERLEY. Of course, there will be no doubt as to Congress authorizing this particular armament, if it is a part of the scheme of the Hawaiian Islands which has been entered upon and which will be unquestionably carried out.

Gen. CROZIER. And of which this, as far as the present coast-defense plan is concerned, terminates it.

Mr. SHERLEY. This is for Pearl Harbor?

Gen. CROZIER. This is for Pearl Harbor; yes. There have been some tentative plans looking toward the installation of some artillery of similar kind to what we use in coast defenses, but intended for use over on the other side of the island in preventing the landing of troops, but there is no estimate for that now.

Mr. SHERLEY. Will the emplacements be ready for this ordnance at Pearl Harbor?

Gen. CROZIER. I do not see any reason why they should not, as the emplacements are not very large for 6-inch guns and 4-inch guns.

Mr. SHERLEY. Is the other ordnance for the Hawaiian Islands ready for mounting or mounted?

Gen. CROZIER. No—

Mr. SHERLEY. What is the specific condition?

Gen. CROZIER. Not all of it. There are mounted in the Hawaiian Islands two 3-inch, two 6-inch, two 12-inch guns, and eight 12-inch mortars, and there are provided for, but not yet mounted, two 14-inch guns and eight 12-inch mortars.

Mr. SHERLEY. How early is it expected that these guns and mortars not yet mounted will be mounted?

Gen. CROZIER. That is the state of the case now; they ought to be over there and mounted within a year, both the 14-inch guns and the 12-inch mortars.

Mr. SHERLEY. I understand that Pearl Harbor has been sufficiently dredged to permit of a cruiser entering it. Do you know whether that is accurate?

Gen. CROZIER. I understand that is the case and that a large vessel has been in there, of the naval service.

LOCATION OF FORTS IN PHILIPPINE AND HAWAIIAN ISLANDS.

Mr. SHERLEY. General, for my information, I would be glad if you would indicate just where these forts that I shall call to you are situated in the Philippines and in Honolulu: Fort Mills, Manila Bay, is on what island?

Gen. CROZIER. It is on Corregidor Island.

Mr. SHERLEY. Fort Frank?

Gen. CROZIER. Carabao Island.

Mr. SHERLEY. Fort Drum?

Gen. CROZIER. That is on El Fraile.

Mr. SHERLEY. Fort Hughes?

Gen. CROZIER. Fort Hughes is on Caballo Island, which is near Corregidor.

Mr. SHERLEY. Fort Wint?

Gen. CROZIER. That is on Grande Island, Subic Bay.

Mr. SHERLEY. Fort De Russy?

Gen. CROZIER. Fort De Russy is near Honolulu, Hawaii.

Mr. SHERLEY. It is not Pearl Harbor—it is Honolulu proper?

Gen. CROZIER. I think it is.

Mr. SHERLEY. Fort Ruger, where is it?

Gen. CROZIER. Fort Ruger is on Diamond Head.

Mr. SHERLEY. Fort Armstrong?

Gen. CROZIER. That is at Honolulu, right out in front of the town, where there is a small battery.

Mr. SHERLEY. Kamehameha?

Gen. CROZIER. That is at Pearl Harbor.

PURCHASE, ETC., SEACOAST CANNON, INSULAR POSSESSIONS.

Mr. SHERLEY. I understood you to say there would be some delay in furnishing the guns for El Fraile—the ordnance?

Gen. CROZIER. Yes; the batteries will be somewhat behind time there. But do not understand me as indicating I think that is going to delay matters. I mean they will not be done as soon as we expected them to be at first, and as the contract calls for, but I am rather inclined to think they will be ready as soon as needed; that is, as soon as the emplacement is ready to put them on it.

Mr. SHERLEY. General, as to the fortification at El Fraile, the fire control is being handled through the Ordnance Department in connection with the ordnance, is it?

Gen. CROZIER. No; all we do is to furnish certain instruments, but the installation is not made by us. The engineers make whatever structures are necessary to put the things in place.

Mr. SHERLEY. Is that true as to El Fraile?

Gen. CROZIER. The Ordnance Department is simply following the usual course of furnishing certain of the implements, except one class of instruments called the data transmitter, which is intended to throw up figures and other directions at a distant place from where the information is first obtained, and we are putting those in, although they are usually put in by the Signal Corps. That is the only exception to the usual rule. We always put the sights on the guns; we manufacture them and put them on, and the sight for those batteries is a very considerable affair; it looks something like an astronomical telescope.

Mr. SHERLEY. Has there been a definite determination of all plans for El Fraile besides the matter of ordnance, pure and simple?

Gen. CROZIER. That I do not know. We have determined all of ours definitely—everything connected with the turrets and such of the turret machinery as we supply, and the ammunition hoists and the guns and gun carriages and the sights; but as to the structural work of the emplacement, which is in the hands of the engineers, I do not know whether they have entirely completed their plans or not. Of course, we have to work together on that portion of the plans where the material comes together; that is, the seats for our roller paths and things of that sort. Those have necessarily to be worked out together.

Mr. SHERLEY. There was a statement made by Col. Burr in his estimates as to the engineer work in the Philippines which proved to be about a million and a half dollars too small. Was there any of the increased cost made necessary by any change in ordnance plans?

Gen. CROZIER. No, sir.

Mr. SHERLEY. You are not informed as to the changes that made the increased cost in the engineers' estimate?

Gen. CROZIER. The subject of the penetration of projectiles into concrete is more or less a new subject and partially untried, and we have for the past year or two been making experiments with the Engineer Corps; that is, they have put up their structures at Sandy Hook and we have fired at them with our projectiles, in order to afford them knowledge on this subject. They have tried different methods of reenforcing their concrete, in order to enable it to resist better, and they have, I think, gotten some new information. I should say that the probabilities are that such changes in their plans as may have been necessary resulted from the knowledge they acquired in this manner. Of course it would not be very desirable to

have the structures out there such that, although the turrets themselves might be impenetrable to the projectiles, you could shoot in under the turrets by shooting through the concrete on which they rested; and the size of the island is somewhat limited, so that the concrete can not be increased in thickness indefinitely, and I fancy that the engineers have wished to make everything very secure in that respect.

FOR PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR SEACOAST
CANNON, INSULAR POSSESSIONS.

Mr. SHERLEY. General, the next item is for the purchase, manufacture, and test of ammunition for seacoast cannon, including the necessary experiments in connection therewith, and the machinery necessary for its manufacture at the arsenals, \$500,000. That is reserve ammunition for the insular possessions?

Gen. CROZIER. That is what it is.

Mr. SHERLEY. The note states that the amount estimated is sufficient to complete the supply of ammunition as originally prescribed by the National Coast Defense Board for seacoast cannon for which appropriations have been provided. An increased allowance deemed necessary for certain mortar batteries, and approved by the Secretary of War, July, 1911, will require additional funds, estimated at \$1,226,242. Can you explain a little more fully the nature of the increased allowance deemed necessary and the reason for it?

Gen. CROZIER. Yes, sir. It is considered desirable to give 20 rounds of mortar 700-pound projectiles with increased range, of which I spoke a short time ago, for batteries Geary, Way, and Wheeler, three batteries in Manila, and for two batteries in Honolulu. The amount of that increase is \$170,006.40. It is designed to add 80 rounds per mortar of 824-pound and 1,046-pound projectiles for batteries Geary and Way, of Manila Bay. That is a pure increase. It does not come from any change in projectile or anything else, but we just add 80 rounds ammunition additional per mortar to that which already has been provided, which was two hours' supply, in view of the fact that this place may be expected to withstand something like a siege.

Mr. SHERLEY. What is the life of a mortar?

Gen. CROZIER. We have never reached the life of one of them yet. They do not fire a very large charge of powder, and they are good for almost an indefinite number of rounds. We have never found the rifling injured in any of the mortars thus far.

Mr. SHERLEY. This increase then relates only to mortars?

Gen. CROZIER. Only to mortars; yes.

Now, there is another increase of 150 rounds per mortar for the mortars of two batteries at Manila Bay, of the mortar shrapnel which I spoke about this morning, which is intended to make it uncomfortable for people operating against these islands from the shore. That increase would mean \$610,884.

Mr. SHERLEY. According to your notes, you are within \$500,000 of the moneys necessary to supply all of the reserve ammunition originally contemplated for all of the armament in the insular possessions. In view of the fact that quite a large amount of that armament is not yet mounted, have you not reached pretty nearly your full reserve for the guns that are mounted?

Gen. CROZIER. Yes, Mr. Chairman. A large part of this increase I have spoken of is for the batteries which are on Corregidor Island.

Mr. SHERLEY. I was eliminating that increase in my question as to the reserve heretofore thought sufficient. You have now received money enough to more than supply this to all ordnance that is mounted?

Gen. CROZIER. Yes; that is so.

Mr. SHERLEY. It will be some months before any of this additional ordnance can be mounted?

Gen. CROZIER. Yes.

Mr. SHERLEY. Is there need of eliminating for the present the extra reserve that is for the first time estimated here, or is there any need for additional money?

Gen. CROZIER. We are not asking for anything for this extra allowance, but your question is as to whether, being now \$700,000 short of the old allowance—

Mr. SHERLEY. \$500,000 short?

Gen. CROZIER. No; \$500,000 we ask for and \$200,000 we will still lack if we get that \$500,000.

Mr. SHERLEY. The note says the amount estimated is sufficient to complete the supply.

Gen. CROZIER. It should be "sufficient to complete within \$200,000 the supply of ammunition as originally provided for the seacoast guns, for which appropriations have been provided."

Mr. SHERLEY. The note here, of course, has no \$200,000 in it.

Gen. CROZIER. That should be "the amount estimated is sufficient to complete within \$200,000." So that we are now \$700,000 short of the amount that would be required for all of the guns that have been thus far provided for.

Mr. SHERLEY. No, no—\$700,000 short of all of the guns that are to be mounted. Is not that true?

Gen. CROZIER. That is the same thing. Except these five little guns going to Hawaii, they have practically all been provided for.

Mr. SHERLEY. What reserve has been provided for as to the guns that are mounted now? Are we not up to what was originally found necessary?

Gen. CROZIER. Yes; as far as the guns that are mounted now, we are, but we will have some more of these guns mounted before we get a chance to get any more money. I fancy that most of the guns that have been provided for will be emplaced before we could manufacture ammunition for them, if we do not get this appropriation now. Some of them will not. Those that go on El Fraile Islands we do not need ammunition for now, but the total amount that has been appropriated for ammunition for these guns in the insular possessions is \$1,700,000. That leaves us \$700,000 short, which shortage is about 40 per cent of what has been supplied. The total amount needed, according to the old estimates, would be \$2,400,000. We have had \$1,700,000, so that we have got—

Mr. SHERLEY. It is a little over two-thirds?

Gen. CROZIER. Yes.

Mr. SHERLEY. Two-thirds would be \$1,600,000.

Gen. CROZIER. We have something like 70 per cent, I think. Considering that old estimate alone, the ammunition is up to the guns.

Mr. SHERLEY. It looks like, General, the moment we get close up to the guns we get a new estimate as to what is necessary for reserves. It is rather discouraging to the committee.

Gen. CROZIER. I understand that, Mr. Chairman, but this increased allowance for those particular places was made as a result of the studies of people who are pretty closely concerned with the defense out there. It is recommended to the Secretary of War by the Chief of Staff, especially, in a special memorandum and approved by the Secretary of War. The increased allowance applies, as I say, only to a limited number of pieces. It applies to certain other mortars in certain parts of the United States, and to nothing else but mortars, and it applies also to certain of the mortars in the insular possessions and the Panama Canal, and to nothing but the mortars. There is no increased allowance provided for any of the guns.

Mr. SHERLEY. What is the state of the Treasury balance under this item, General?

Gen. CROZIER. On January 15 there was in the Treasury \$311,533.34. There was due to arsenals for material under manufacture \$210,329.65, and there was due to meet obligations of existing contracts \$99,336.44, leaving an unobligated balance of \$1,867.15.

TUESDAY, JANUARY 16, 1912.

**STATEMENT OF BRIG. GEN. WILLIAM CROZIER, CHIEF OF
ORDNANCE, UNITED STATES ARMY—Continued.**

**ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY, INSULAR
POSSESSIONS.**

Mr. SHERLEY. The next item is:

For the alteration and maintenance of the seacoast artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work, and expenses of the civilian mechanics, and extra-duty pay of enlisted men engaged thereon.

Your estimate is \$33,585.

Gen. CROZIER. Now, that is intended for the care of 79 pieces of artillery, ranging in size from the 14-inch gun down to the 3-inch gun. Those guns are installed, or are expected to be installed the 30th of next June, at which time this appropriation will commence.

Mr. SHERLEY. What proportion of this fund allotted last year was for machinery, tools, and materials, if you can state it—particularly as to machinery and tools?

Gen. CROZIER. The estimate is divided about as follows: For the repair and maintenance of these 79 guns and mortars, with their carriages, fire-control instruments, exclusive of cleaning and preserving materials like oil and waste, etc., but including the pay of machinists and the extra-duty pay of enlisted men engaged on the work, \$17,775; the maintenance of three repair shops, two in Manila Bay and one at Subic Bay, including light and power, \$900, and the maintenance of nine post and three district sets of maneuver material for mounting and dismounting guns, \$1,650; for alterations and improvements that come along, \$4,500; and for cleaning and preserving

materials of all kinds, and appliances, \$8,760. These cleaning and preserving materials in the United States are procured out of another appropriation, that of ordnance stores and supplies, but in the Philippine Islands, as this committee has expressed a wish to have all those expenses segregated, we have put that kind of expenses in this appropriation instead of taking them out of the general appropriation for ordnance stores and supplies, as we have in the United States, and have for a good many years.

Mr. SHERLEY. How large are these machine shops?

Gen. CROZIER. They are small affairs, not much larger than this room, where ordinary repair work can be done. We have a number of them scattered about the coast in the United States, and we usually have in them a motor operated by electricity, a lathe, a drill press, an emery wheel, and sometimes a little milling machine or some kind of shaper, and a small portable forge to make little forgings.

Mr. SHERLEY. What is meant by the phrase "extra-duty pay"?

Gen. CROZIER. When enlisted men are required to do regular laboring work continuously—that is, for more than 10 days at a time—the practice is to pay them extra for it at the rate, depending on the work, of 35 cents a day or 50 cents a day, and it is called extra-duty pay; a man has to be specially assigned to that work by order from some superior authority sufficiently high.

Mr. SHERLEY. What is the Treasury balance under this item?

Gen. CROZIER. On January 4 there was in the Treasury \$26,328.10; there was due to arsenals for work which they were doing \$4,872.67; and there was an unallotted balance, intended to carry the material through the rest of the year, of \$21,455.43.

Mr. SHERLEY. That unallotted balance is something over half of the total, though half of the year has elapsed?

Gen. CROZIER. Yes, sir; we do not consider it good policy to have the exact proportion of the funds corresponding to the proportion of the year which has passed expended; contingencies are always likely to arise, there are always breakages, etc., so that we hold back a certain amount, and then toward the end of the year, when the risk of contingencies has been reduced, we apply that money to certain things that we would have applied it to earlier if it had not been for the prudence necessary in providing for accidents.

Mr. SHERLEY. Do you anticipate a complete use of all this fund in the current year?

Gen. CROZIER. I think this one will be used, yes; but there is one coming later which, perhaps, may not all be used in the current year.

Mr. SHERLEY. I notice your estimate is rather detailed, as indicated by the odd figures—\$33,585?

Gen. CROZIER. Well, we have certain allowances of cleaning and preserving materials per gun, which, of course, are not large per gun, and then when we multiply those allowances we get these detailed figures.

Mr. SHERLEY. That extra-duty pay is in accordance with the practice of the department and existing law?

Gen. CROZIER. Existing law; yes, sir. We had to get a little change in the law a few years ago to permit the payment of it. Of course, the ordinary cleaning of the material by the use of these cleaning and preserving materials is done by the Artillery soldiers as a part of their duty, and all that this appropriation is to be charged with, with

reference to that work, is supplying the cleaning and preserving materials.

But we employ machinists wherever we have a considerable number of guns, who have charge of these repair shops and who keep the material in order, and those machinists have to have assistants, men who will help them lift things about, etc., and we do not consider it a good plan to employ civilian helpers for that; therefore, we usually detail for that work an enlisted man for a period of time as a helper, and he will work eight hours a day, just as the machinist does, and for that work he is given the extra-duty pay.

MECHANICAL SUPERVISION OF THE INSTALLATION OF SEACOAST ARTILLERY,
INSULAR POSSESSIONS.

Mr. SHERLEY. The next item is:

For the mechanical supervision of the installation of seacoast artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work, and expenses of civilian mechanics, and extra-duty pay of enlisted men engaged thereon.

The estimate calls for \$6,600?

Gen. CROZIER. When these heavy guns and carriages are sent out to the fortifications for the purpose of being mounted thereon, a great deal of skill is required in seeing that they are set up properly; they are pretty exact machines, and they have to be knocked down in order to be shipped, because they are so large and heavy, and when assembled together again it requires a machinist to do the assembling properly. We usually send only one machinist to the places where they are assembled. The material and all necessary labor for erecting the machines are supplied by the Engineer Department, but if the Engineer Department does not do so, it is supplied by the Artillery. Ordinarily our part is only to furnish the skilled supervision. We, of course, will have to take a great deal of care when it comes to erecting these turrets and assembling them and putting the guns and carriages in their places; perhaps we will have to send more than one man for that particular job to exercise supervision.

Mr. SHERLEY. You are asking an increase of some \$2,400. Is that in view of the work necessary in erecting these turrets?

Gen. CROZIER. Yes, it is; but as the turrets will not be ready, I shall not need that increase, and I can get along all right if the same amount is appropriated as was appropriated last year.

Mr. SHERLEY. What are the Treasury balances in connection with this item?

Gen. CROZIER. The balance in the Treasury is \$8,320; there is due to the arsenals, for work under way, \$250; and there is an unallotted balance of \$8,070. This unallotted balance is for guns and carriages under manufacture, but not yet sent out to the Philippines, and it is larger than I think we will need right away, and I expect that the estimate for the next year could be reduced below that of last year; that is, come down below \$4,200. I should say that if \$2,500 or \$3,000 were given it would be sufficient.

Mr. SHERLEY. This is practically a new provision that was put in owing to the additional trouble and expense of erecting ordnance in the insular possessions?

Gen. CROZIER. Well, it is a new provision, but it resulted from separating it from the one that we have just been dealing with; they

were at first united. We lumped together in one appropriation the alteration and maintenance and the supervision of the new installations; then it was thought that the alteration and maintenance had better stand by itself, because the supervision of new installations would finally be terminated and that appropriation would cease.

PURCHASE OF MATERIAL OF AMERICAN MANUFACTURE.

Mr. SHERLEY. On the next page is a provision in the same language heretofore carried in this bill: "That all material purchased under the provisions of this act shall be of American manufacture, except in case when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases in limited quantities abroad, which material shall be admitted free of duty." You have already testified that on some occasions you made purchases in limited quantities abroad; I would like to ask you whether, in your judgment, there would be any value to the Government if the limitation as to purchasing in limited quantities was not in the bill?

Gen. CROZIER. That would give to the legislation a different character from that which it has ever been assumed to have before. I have never used that authority for the purpose of obtaining material abroad at a less price than I could obtain it in the United States; I have only used it for obtaining a quality of material which could not be had in the United States. I have regarded it as the general policy of the Government to get what we could at home, irrespective of the cost.

Mr. SHERLEY. Would it not be of some value in giving a weapon to the department in dealing with private manufacturers so as to bring about a proper and reasonable price for material furnished to the Government?

Gen. CROZIER. It might be of some value in regard to material which the Government would not be able to produce itself in its own establishments. I should, of course, like to have the most liberal authority possible, but it would have to be used with judgment, of course, because one thing that we have to take into consideration is the undesirability of becoming dependent upon a foreign source of supply for any military material which is essential, from which source of supply we might be cut off in the case of a threat of war.

Mr. SHERLEY. Speaking for myself only, I thoroughly agree with the statement just made, that it is desirable that the country should be self-sustaining, if I may use that phrase, as to material that would be desirable in time of war; but there has developed in connection with the Panama Canal and other cases situations where it looked very much as if the Government was being held up in price, and with a limitation that would require an authorization by the Secretary of War, is there any objection in your mind to the granting of the larger power that would come by striking out the words "in limited quantities"?

Gen. CROZIER. I see no objection to it whatever.

Mr. SHERLEY. In the event that those words were stricken out, do you think it would enable the War Department to obtain materials cheaper?

Gen. CROZIER. There is some material which I am quite certain we could obtain more cheaply abroad than we get it at home. I think

we could get field artillery, made after our own designs, more cheaply manufactured abroad than we get it manufactured at home by private manufacturers. I do not know that the difference would be worth our sending inspectors over there for the purpose. However, of course, I would like the plants and the experience in this country to supplement our own arsenals.

Mr. SHERLEY. Do you think the fact that you were at liberty to make these purchases abroad and to invite bids would of itself bring about a reduction in cost from American manufacturers?

Gen. CROZIER. It might, Mr. Chairman. I do not remember any recent instance where I have been particularly impressed with the extravagant price which has been asked us for material, except in certain special classes, and in regard to those classes I have not seen much prospect of relief even if I should be allowed to go abroad. There are some things in which our own manufacturers can have an understanding with foreign manufacturers, and I think that, as a rule, the foreign manufacturers will not help us out against our own manufacturers in the matter of price unless they see ahead a prospect of very large orders. They will not interfere with our own manufacturers unless it is made quite well worth their while by the prospect of considerable business.

Mr. SHERLEY. In your own particular expenditures you are somewhat protected by the fact that you very largely manufacture, yourself, some articles that you buy from private manufacturers?

Gen. CROZIER. Yes; that is a considerable protection, Mr. Chairman.

Mr. SHERLEY. That applies more peculiarly to matters coming under the Ordnance Department than anywhere else, does it not?

Gen. CROZIER. Yes. The Ordnance Department is the largest manufacturing department connected with the War Department. The Quartermaster's Department manufactures clothing, but nobody else manufactures his product to any extent. The Navy Department manufactures guns and gun carriages as well, and, of course, they sometimes build ships also.

Mr. GOOD. General, has there been very much difference in the price of those articles that you purchased abroad from the price that you were obliged to pay at home?

Gen. CROZIER. The greatest difference that I remember now, Mr. Good, is in a case of some field guns and carriages which we bought abroad along about 1905; then the price which I paid for them abroad was only about half what was asked by private manufacturers in this country. The material was made after our own designs and drawings, so it was only a manufacturing process that the private parties were called upon to go through; there was no private designing connected with it at all. At that time the arsenals were full of work and the private establishments in the country were also full of work, so that there was not very keen competition for this class of work.

Mr. GOOD. From what country were those guns purchased?

Gen. CROZIER. Germany. It was not exactly a purchase, Mr. Good; it was an order for manufacturing in accordance with our design. We furnished the drawings, designs, and specifications.

Mr. GOOD. What was the difference in the wages paid to laborers engaged on that class of work in this country and in Germany at that time, if you recall?

Gen. CROZIER. I do not recall. The work was ordinary machine-shop work, and the difference would be the standard difference of wages between Germany and the United States for machinists.

Mr. GOOD. Do you know about what that was at that time?

Gen. CROZIER. I do not.

Mr. GOOD. Do you think this difference of cost any more than the measure of difference in the price of the labor of the two countries that went into the manufacture of the guns?

Gen. CROZIER. I rather think it was more than that.

Mr. GOOD. Very much more than that?

Gen. CROZIER. An answer to that question would require an estimate as to the relative productiveness of the workmen who were engaged on the work in Germany and those who would have been engaged on it in the United States; and I was not close enough to the work in Germany to form a good estimate of that. Your own opinion would be as good as mine.

Mr. GOOD. You have stated that the manufacturers of guns and the arsenals had all the work they could perform at that time. How about conditions in Germany at that time?

Gen. CROZIER. Well, the German manufacturers were very anxious to get this work.

Mr. GOOD. If the War Department was given unlimited authority to purchase abroad things that are authorized in this bill, and the policy of purchasing abroad was continued for a series of years, what result would follow such a policy?

Gen. CROZIER. If the two things were to go together and the authority should be taken advantage of liberally, it would have the result, I think, that we could get our material somewhat cheaper, but that our own people would be less able to produce it for us when we wanted to use their resources.

Mr. GOOD. Suppose such a policy were followed—the purchasing of these guns abroad and the cutting down of these appropriations—in what condition would we find ourselves in time of war?

Gen. CROZIER. I think our condition would not be so advantageous as it would be if we kept these plants in existence and gave them work which would enable them to keep up in experience.

Mr. GOOD. Is it not very essential, General, in manufacturing or purchasing the articles that are enumerated in this bill, that they should be either manufactured in the United States by the Government or purchased from factories that are located in the United States?

Gen. CROZIER. I think that is generally a sound proposition; that is to say, I think the principle of the protective policy is certainly a good one in so far as it refers to preparation for war. Now, that is not an economic question at all; it might be more expensive, but the whole process of preparation for war is expensive.

Mr. GOOD. Is it not a patriotic policy, as well as a protective policy, to purchase these things at home?

Gen. CROZIER. Yes, sir; I should say that the word "patriotic" would better describe it than the word "protective," if by protective you simply refer to the economic features of it.

Mr. GOOD. Do you not think the abuse that might follow the elimination of the words "in limited quantities abroad" would

result in a great deal more harm than the insertion of those words would do harm in this bill?

Gen. CROZIER. I do not believe that authority would be very liberally taken advantage of, Mr. Good.

Mr. GOOD. I do not think it would either, under the present organization, but suppose the organization were changed so that one having the purchasing power felt it was better to purchase abroad, then might not the elimination of the words under that kind of a policy do more harm than good?

Gen. CROZIER. Well, the way would be open where some one who was thinking more of economy than of patriotic necessity could, perhaps, do harm.

Mr. GOOD. Do you feel you have been hampered very much in operating under this law?

Gen. CROZIER. No; I have not. It is a more liberal law than the Navy Department has, because it has not this authority. Under this law I have been able to make purchases abroad when it has been a question of quality, and as to the question of cost, I put that up to you gentlemen, and if I have to pay too high a price I tell you why.

Mr. SHERLEY. If you had not been limited by the words "in limited quantities," have there been occasions when you would have bought more largely abroad?

Gen. CROZIER. I do not remember any recent case. Even the words "in limited quantities" are somewhat indefinite; you might say that every quantity has a limit.

Mr. SHERLEY. It may be that the construction of the War Department on the words "in limited quantities" reaches my own position, so that a change is not necessary, and if that is true I am in thorough accord with the department.

BOARD OF ORDNANCE AND FORTIFICATION.

Mr. SHERLEY. The next item, General, is the one relating to the Board of Ordnance and Fortification. You ask this year for an appropriation of \$50,000, which is twice your estimate of last year, and twice the appropriation of last year and the year previous?

Gen. CROZIER. Yes. This appropriation is for experimental purposes, and it is difficult to make an estimate as to how much will be needed. Although the estimate is twice as much as was appropriated for the current year, and twice as much as appropriated for the year preceding, it is only half as much as was appropriated for the year before that, and the same as was appropriated the year before that. These appropriations started in 1892 with \$155,000. Now, in the following year there was appropriated \$210,000 and the next year \$125,000; then it ran along at \$100,000 or \$150,000 down to the year 1905, when the estimate was reduced by the board itself, because it was seen there would not be as much money needed as had been appropriated, and since then the estimate has been made depending simply on the condition of the balance.

Mr. SHERLEY. What is the condition of the Treasury balance now?

Gen. CROZIER. I have not got that, but you will see that the allotments during the current year amount to \$44,000. I am not the president of that board, although I am a member of it.

Mr. SHERLEY. Please put the condition of that balance in the hearing.

Gen. CROZIER. I will be glad to do that. I may say, as I said a moment ago, that the board took the initiative in reducing these estimates. Congress had gotten into the habit of appropriating \$100,000, and did that for a series of years—did it for seven years without any change.

Mr. SHERLEY. And you accumulated quite a balance?

Gen. CROZIER. We accumulated quite a balance, and since that time, with the exception of one year, the appropriations have been very much less.

Mr. SHERLEY. Of course, it is more or less problematical just how much money would be used?

Gen. CROZIER. It depends upon the stimulation of invention, Mr. Chairman.

[NOTE.—The following is the status of the account January 27, 1912, under the appropriation referred to above.

Balance in Treasury \$129,584.99.

Of this amount there is obligated on contracts, to auditor for transfer to ordnance appropriations, and on allotments made the Ordnance Office for work in progress, \$27,085.66, leaving an unallotted balance of \$102,499.33.]

APPROPRIATIONS TO BE IMMEDIATELY AVAILABLE.

(See also p. 71.)

Mr. SHERLEY. I notice a new item, in the following language:

Appropriations herein and hereafter made for fortifications and other works of defense shall be immediately available and shall remain available until expended.

Have you anything to say as to that item?

Gen. CROZIER. Well, we had always considered that that was permitted; we did not consider this an annual supply bill, but under a ruling of the Treasury Department that has been stopped, and we simply wish to go back to what the practice was before and had been for years. You may remember, Mr. Chairman, that several times during the course of these hearings I have been asked the amount of funds necessary to last over to March 4, 1913, when the next appropriation bill would have been passed, and in accordance with the practice the sums would then have been available, but under the recent ruling of the Treasury Department they would not be available, and under that legislation those questions would have to shift so as to relate to June 30, 1913, instead of March 4.

Mr. SHERLEY. You think that the character of the work provided for in this bill is such as to make it desirable that the funds should be available until expended?

Gen. CROZIER. Yes, sir; I think that is desirable, because many of the items are for large constructions that take over a year in their manufacture. For instance, if I have a number of guns or a number of large gun carriages to make it would be more expensive for me to make them in a short time, because they are most economically manufactured if they pass through one manufacturing establishment, and if I had to divide them among several establishments in order to facilitate their completion it would mean duplicate sets of patterns

or triplicate sets, duplicate or triplicate sets of jigs and fixtures, etc., and all of that would make the cost greater.

Mr. SHERLEY. It is also desirable, I presume, to immediately proceed with the work authorized in the bill without waiting for the beginning of the year for which the bill is a supply bill?

Gen. CROZIER. Yes, sir; that is very true. This is scarcely in the nature of a supply bill. That is, the materials provided for in this bill are scarcely in the nature of supplies. Reserve field artillery and reserve ammunition are not current supplies; they are not currently used, but simply provided and stored away until needed. Seacoast material, except for target practice, is not a current supply.

Mr. SHERLEY. General, you recall that earlier in the hearing I suggested that you might indicate the character of a provision desirable in the event that the committee adopted the policy as to certain work, of authorizing the work to be entered upon without appropriating at this time the total necessary to complete it?

Gen. CROZIER. Yes; I think that question was raised by yourself. Mr. Chairman, with regard to two items in the bill. The first was—

For the purchase, manufacture, and test of mountain, field, and siege cannon, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals—

for which the estimate is \$1,002,000. Now, I think that matter would be in a satisfactory state if this wording were introduced:

For the purchase, manufacture, and test of mountain, field, and siege cannon, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals, \$500,000: *Provided*, That the Chief of Ordnance, United States Army, is hereby authorized to enter into contracts or otherwise incur obligations for the purposes above mentioned not to exceed \$502,000, in addition to the appropriations herein and heretofore made.

Mr. SHERLEY. Of course, that language would be applicable if different figures, both as to appropriations and allowances, were used?

Gen. CROZIER. Yes, sir. Now, the other subject was that of seacoast guns and carriages for the insular possessions:

For the purchase, manufacture, and test of seacoast cannon for coast defenses, including their carriages, sights, implements, equipments, and the machinery necessary for the manufacture at the arsenals—

for which the estimate is \$83,600, and which I told you might well be reduced to \$71,400. The wording in that case, which would, I think, cover our necessities, would be the following:

The Chief of Ordnance, United States Army, is, in addition to appropriations heretofore made, hereby authorized to enter into contracts or otherwise incur obligations not to exceed \$71,400 for the purchase, manufacture, and test of seacoast cannon for coast defenses, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals.

No appropriation would now be necessary under that.

Mr. SHERLEY. General, that, I believe, is all, and the committee is very much obliged to you for the information you have given them.

Gen. CROZIER. I hope I have been able to make your task a little bit easier. I sometimes am impressed with the inadequacy of my explanations to cover a rather large subject.

WEDNESDAY, JANUARY 17, 1912.

UNDER THE CHIEF SIGNAL OFFICER.

STATEMENT OF BRIG. GEN. JAMES ALLEN, CHIEF SIGNAL OFFICER, UNITED STATES ARMY.

Mr. SHERLEY. You are the Chief Signal Officer?

Gen. ALLEN. Yes, sir.

CONSTRUCTION OF FIRE-CONTROL STATIONS AND ACCESSORIES.

(See also p. 13.)

Mr. SHERLEY. There is an item on page 3 of the bill for the construction of fire-control stations and accessories, etc. This estimate is, I believe, submitted by the Artillery Corps, and then the money allotted to the Engineer Department, the Signal Corps, and the Ordnance Department.

Gen. ALLEN. Yes, sir.

Mr. SHERLEY. There is an amount this year of \$200,000 which is estimated to be necessary for the installation of a permanent system of fire control at Narragansett Bay?

Gen. ALLEN. Yes, sir.

Mr. SHERLEY. How much of that sum is it contemplated will be allotted to the Signal Corps?

Gen. ALLEN. We have not estimates of that as yet, sir, except the original Taft Board estimates.

Mr. SHERLEY. What proportion of the funds under this item are usually allotted to the Signal Corps?

Gen. ALLEN. Possibly 25 per cent—25 to 30 per cent.

Mr. SHERLEY. You now have installed a temporary system of fire control?

Gen. ALLEN. A provisional system, so called; yes, sir.

Mr. SHERLEY. You have no detailed information as to the amount that will be necessary for your corps out of that sum?

Gen. ALLEN. At that point, no, sir; except the original Taft Board estimates. That could be made up, because we have other defenses that are about the same size, and we know how much it cost there.

OPERATION AND MAINTENANCE OF FIRE-CONTROL INSTALLATIONS.

Mr. SHERLEY. The first item that is directly under you is on page 12 of the bill, "For operation and maintenance of fire-control installations at seacoast defenses." The estimate is \$180,000. Can you say what the condition of your Treasury balances is at this time under that item?

Gen. ALLEN. No, sir. I will have to put that in if you want to know the amount of the Treasury balances, because they change so much every day. I will have to get that from the office.

Mr. SHERLEY. In a statement submitted to the committee some months ago it appears that the total amount that had been expended by your corps is \$703,287.69, and that the balance available is about \$75,448.22.

Gen. ALLEN. That is about it, approximately; about \$80,000 would be our Treasury balance.

Mr. SHERLEY. Is that Treasury balance allotted or unallotted?

Gen. ALLEN. That is unallotted, I should say.

Mr. SHERLEY. Will you put into your hearing a statement of this date as to the exact amount that is allotted and the amount that is unallotted?

Gen. ALLEN. Yes, sir. Of this appropriation for the current fiscal year there remains \$74,232.68 unobligated and available for current maintenance expenses from this date to July 1.

Mr. SHERLEY. What is the policy pursued by your department as to the allotment of these annual appropriations for maintenance?

Gen. ALLEN. We make an allotment of so much to each division chief signal officer, to our general supply depots and cable ships, based on their estimates, but the majority of our purchases are made by our disbursing officer in Washington. Do you want a statement as to what the things are?

Mr. SHERLEY. Well, you have had an annual appropriation for the past two years of \$180,000. Now, what is the practice in distributing that sum over the year for which it is appropriated?

Gen. ALLEN. There are certain fixed charges that are provided for, such as clerical hire, engineers, and fixed expenses of that kind.

Mr. SHERLEY. What does that amount to?

Gen. ALLEN. That amounts probably to \$70,000. I will have to put that in accurately. I could take it off of this paper that I have here in a moment or two, but I will put it in later on. That also includes the running of cable ships and things like that.

Mr. SHERLEY. I would be very glad to have a detailed statement of the fixed charges under this item.

Gen. ALLEN. Yes, sir.

[NOTE.—Fixed charges for clerical expenses and the services of electrical experts in the United States, \$56,593.95.]

Mr. SHERLEY. What do you estimate to be the amount of property that is maintained from this fund?

Gen. ALLEN. We estimate in the United States it is \$1,900,000. We have put in altogether \$2,500,000; we estimate the value to be, after deterioration, etc., \$1,900,000. Did you ask for the installation?

Mr. SHERLEY. I asked for the value of the property that is maintained by this fund.

Gen. ALLEN. At least \$1,900,000.

Mr. SHERLEY. So you estimate about 10 per cent for maintenance?

Gen. ALLEN. Yes, sir.

Mr. SHERLEY. What is the character of this property?

Gen. ALLEN. It consists of all the different articles that are put in fire-control systems, the equipment of the fire-control systems. It consists largely of cables, telephones, and telephone systems, switchboards, storage batteries, etc.; all of it, or nearly all of it, is electrical material of various kinds.

Mr. SHERLEY. Your cables are underground?

Gen. ALLEN. Underground, and some under water.

Mr. SHERLEY. There is no maintenance charge as to those?

Gen. ALLEN. Oh, yes; a very large maintenance charge. The cables that cross these harbors and rivers are continually being torn

up by steamers, and they cost us more than any other one item that we have.

Mr. SHERLEY. Is all of this property exposed to weather conditions?

Gen. ALLEN. It is more or less exposed. It is in buildings, to be sure, but on the seashore; and a great deal of it is subject to more exposure than it would have if it were in buildings used in civil life.

Mr. SHERLEY. This fund is not used for the maintenance of the buildings themselves?

Gen. ALLEN. No.

Mr. SHERLEY. It is for materials only?

Gen. ALLEN. Yes, sir.

Mr. SHERLEY. And that consists largely of telephone instruments?

Gen. ALLEN. The various instruments used in the fire-control system. The telephones are probably the least expensive of all the equipment.

Mr. SHERLEY. Do you think 10 per cent is a necessary amount for the maintenance?

Gen. ALLEN. It seems to be from the experience we have had for the past several years. It is not excessive.

Mr. SHERLEY. In the absence of your balances we are unable to determine how you have gotten along in the past year.

Gen. ALLEN. I could give you a statement of exactly the different items on which we spent the money for 1910; I have that right here, but I do not know that that would be of any use.

Mr. SHERLEY. Well, that might be somewhat illuminating.

Gen. ALLEN. District signal stations; those are wireless stations, \$11,412.19.

Mr. SHERLEY. These are maintenance charges and not operation charges?

Gen. ALLEN. Yes, sir; these are maintenance charges.

Mr. SHERLEY. The item reads, "For operation and maintenance."

Gen. ALLEN. Well, we maintain them. The maintenance expenses are largely due to the operation; we have salaries to pay, which is part of the operation, of course.

Mr. SHERLEY. But what I was trying to arrive at was what it was costing to keep up this material, and therefore I asked whether the item you have just read was a maintenance item pure and simple, or whether it was an item for operation and maintenance.

Gen. ALLEN. No; that will be maintenance alone. Then we have here salaries and incidentals, Department of the Columbia, \$668.33; submarine cable, \$24,778.64; subterranean cable, \$30,053.82; salaries of Signal Corps employees stationed at Washington, \$24,877.11; salaries and incidentals, Department of California, including Fort Mason, \$3,458.45; salaries and incidentals, Department of the East, including Fort Wood, \$21,106.22; miscellaneous, office furniture and supplies, photo room, laboratory, lithos, and printing, \$2,947.19; telephones and telephone systems (except line construction), including instruments, switchboards, storage batteries, motor generators, and repair parts for same, \$49,162.32; salaries and incidentals, Department of the Gulf, \$1,556.61; salaries and incidentals of cable boats, *Henry and Field*, \$6,255.65; telautographs, \$355.02; line construction, materials, and tools, \$5,204.68; miscellaneous supplies and

services not properly chargeable to other allotments, \$7,022.74; to meet excessive expenditures of last year, \$6,047.29; orders for other departments, reimbursement not obtained, \$15,264.18.

Those are the various items for which the appropriation for maintenance was spent during the last year.

Mr. SHERLEY. I have a statement here which shows that there has been expended \$2,470,484 on fire-control material. This, however, includes a very large sum for maintenance and original installation?

Gen. ALLEN. Yes, sir.

Mr. SHERLEY. How did you arrive at that estimate of the total value of the material that has been installed?

Gen. ALLEN. The appropriations for maintenance began in the year 1907; previous to that there was no appropriation except that for installation, out of which, of course, we kept up the maintenance; so that in estimating the present value of the plant that we now have we take everything that was appropriated and then make the necessary deductions; later on we can differentiate between that and maintenance.

Mr. SHERLEY. What I am trying to arrive at is how you estimated the value of property that you have to maintain. You stated it at a certain figure.

Gen. ALLEN. We have got the actual cost, which was, as I told you, \$2,500,000. Now, taking out the cost of maintenance previous to 1907 and certain things that we have abandoned, like telautographs, which are very expensive, and various other things that we have abandoned, amounting, say, to \$600,000, we estimate the value to be at least \$1,900,000.

Mr. SHERLEY. Now, the installation cost ought also to be taken out in figuring the value of the property that you are maintaining, because the cost of installing it has nothing to do with the property which is to be maintained after it is installed.

Gen. ALLEN. I do not quite grasp that.

Mr. SHERLEY. Well, I understood that the value of the property included not only the cost of the material, but the installation of it.

Gen. ALLEN. Oh, yes; you mean this is the total amount that we put into the plant.

Mr. SHERLEY. And when you come to figure up what it costs to maintain it—the percentage of cost—there ought to be eliminated the installation cost. Now, can you tell the committee exactly the value of the property that you have, without regard to the installation?

Gen. ALLEN. Well, we think that when we take out that \$600,000 that would cover all that expense and would leave the value of the property as it exists at \$1,900,000. Another point is, in making the estimate we have now the experience of several years past.

Mr. SHERLEY. How much of this sum is spent for operation, as distinct from maintenance?

Gen. ALLEN. We really do not operate any of it. We turn it over to the Coast Artillery. The Coast Artillery operates it.

Mr. SHERLEY. This language, then, is misleading when it says, "For operation and maintenance of fire-control installations at sea-coast defenses"?

Gen. ALLEN. Well, perhaps I have gone a little too far, because we operate certain cable ships; we have a personnel on them.

Mr. SHERLEY. Will your statement of expenditures segregate the operation charges from the maintenance charges?

Gen. ALLEN. Well, this does it only very approximately; it is pretty hard to do that. For instance, here we have salaries and incidentals of the cable boats *Henry* and *Field*; those are the two signal boats that the Signal Corps operates entirely for fire-control work; and that operation is part of the maintenance of the cables of the various districts, because they keep all the cables up. We do not operate the matériel directly, but we operate the cable boats for the sake of maintaining the cables; it is hard to distinguish exactly between the two.

EXPERIMENTS IN AERIAL NAVIGATION.

(See also p. 136.)

Mr. SHERLEY. There is a general item carried in this bill for experiments. Has any of that sum been allotted to your department for experiments in aerial navigation?

Gen. ALLEN. No; we had last year \$125,000 for the purchase, maintenance, and operation of aeroplanes.

Mr. SHERLEY. That you got from the Committee on Military Affairs?

Gen. ALLEN. Yes, sir; that is, it was in the Army appropriation bill.

Mr. SHERLEY. You shifted your estimates for that sort of work from our committee to that committee?

Gen. ALLEN. Well, you know it was before this committee several times, and last year there was no estimate put in at all by the War Department; it was put in by the House on its own initiative. The money was simply appropriated by the House, the provision being put in on the floor of the House.

Mr. SHERLEY. Has there been any allotment of this experiment fund to your department?

Gen. ALLEN. Is it the fund given to the Board of Ordinance and Fortification?

Mr. SHERLEY. Yes.

Gen. ALLEN. No, sir; not this year. We bought the first aeroplane out of \$30,000 that they gave us.

Mr. SHERLEY. When was that?

Gen. ALLEN. The first Wright aeroplane; that was purchased in 1908.

Mr. SHERLEY. Since then there has been no such allotment?

Gen. ALLEN. No, sir.

FIRE-CONTROL STATIONS.

(See p. 131.)

Mr. SHERLEY. How is the labor employed that is used in the maintenance of this fire-control material? Do you use your own men or employ outside help?

Gen. ALLEN. We have a number of electrical engineers and assistant electrical engineers and we have quite a number of Signal Corps men assigned to this work, but not a very large number.

Mr. SHERLEY. Is it possible to say how large a number?

Gen. ALLEN. No; I think the whole effort of the War Department is to get our enlisted men entirely away from this work and get them back into mobile army work.

Mr. SHERLEY. I can understand how that might be true, that you want a soldier to be doing work pertaining to a soldier, but the repair of instruments of this kind is of itself the most educational work that can be done.

Gen. ALLEN. That is perfectly legitimate work for the Signal Corps, and we put as many to work at it as we can.

Mr. SHERLEY. To what extent are you able to put men at work at it?

Maj. SALTZMAN. We have a few men on duty in district signal stations in operating these wireless stations at district headquarters, but the only other men that we have on this particular duty are in new installations; we have men in the New London district, and have men at Manila and Subig Bays, and at Honolulu, but the only men who are doing strictly maintenance work are those men who are operating district signal stations and who, from time to time, are sent down into a particular district to repair a telephone system or put in new cables, or something like that.

Mr. SHERLEY. Suppose an accident comes to your material at a station and there are no men from your corps; is any effort made to use other men in the repair of this material?

Maj. SALTZMAN. The War Department orders prescribe that Coast Artillery soldiers shall do all of this.

Gen. ALLEN. They have engineers of their own, and when we turn this over they are supposed to do a great deal of that work.

Mr. SHERLEY. What is the size of your corps?

Gen. ALLEN. We have altogether 1,212 men.

Mr. SHERLEY. Where are they stationed?

Gen. ALLEN. Well, there are 200 of them in Alaska; something over 150 or more in the Philippines. We have four field companies in this country that have approximately 100 enlisted men in each of them; that makes 400. We have them stationed at different military posts in maintaining telephone systems, operating telegraph lines, operating wireless stations on transports, etc.

Mr. SHERLEY. How many are stationed in connection with sea-coast fortifications?

Gen. ALLEN. I doubt if we have more than 20 men; not more than 25. There are about 25 other enlisted men on duty on our cable ships.

AERIAL NAVIGATION.

(See also p. 135.)

Mr. RAUCH. General, do any of the bills carry an appropriation for aerial navigation?

Gen. ALLEN. Yes, sir; there is an estimate this year for \$125,000, which has gone to the military committee. They had a hearing on that subject, but, of course, I do not know the action they have taken upon the estimate.

Mr. RAUCH. Do you contemplate doing work of that kind?

Gen. ALLEN. Oh, yes; it is contemplated to put in the same estimate that was put in last year.

Mr. SHERLEY. Last year there was no estimate at all.

Gen. ALLEN. No; but the item was put in on the floor of the House.

Mr. SHERLEY. But it was not requested?

Gen. ALLEN. No; it had been requested for two years before, and no appropriation was made; and last year no estimate was allowed to be put in; that is, the War Department submitted no estimate.

Mr. RAUCH. About how many men are engaged on that work now?

Gen. ALLEN. We have 6 officers who are qualified pilots. The War Department has promised to detail 4 other officers within a day or two, and that will make 10. We have 2 officers who have already qualified, but who are not on duty with the Signal Corps. We have to-day 8 men in the entire Army who are qualified pilots for aeroplanes, and we are going to have 4 more detailed presently.

Mr. RAUCH. Of what do those qualifications consist?

Gen. ALLEN. They consist in being taught to fly one of these machines. There are certain other things that they have to do before they are supposed to be qualified as pilots; they have to make so many flights of certain heights and certain distances.

Mr. RAUCH. How many machines does the Government own?

Gen. ALLEN. Six.

Mr. RAUCH. Of what type are they?

Gen. ALLEN. Well, most of them are Wright machines; we have three Wrights and one Burgess-Wright machine, which is practically the same thing, and two Curtiss machines; practically four Wright machines and two Curtiss machines and one more Curtiss machine ordered, which will be delivered this month; so that will make four Wright machines and three Curtiss machines.

Mr. RAUCH. At what place are these men taught?

Gen. ALLEN. The only station we have used is at College Park, 10 miles out of Washington, on the Baltimore & Ohio Railroad, where we have the hangars; aviators and machines are now at Augusta, Ga., for the winter, and will come back to College Park in April.

Mr. SHERLEY. General, have you abandoned your balloon experiments?

Gen. ALLEN. Yes, sir; we had to quit that; it was too expensive and we got no encouragement and no money, except for captive balloons, which we will keep up and still regard as available. But the dirigible balloon is so expensive that we have never been able to get any money to even get started; it would cost at least \$150,000 for one of the balloons alone.

Mr. RAUCH. Are the men engaged in this work trained in the construction of a flying machine?

Gen. ALLEN. Well, to the extent that they have been to these factories where they make them and have worked in the shops until they could see everything made; they are not mechanics.

Mr. RAUCH. Does the Government contemplate the construction of these machines?

Gen. ALLEN. Not at present; no, sir. The art is so new and so many people are working on it that we are not trying to do any original or creative work; we are depending on what the world is

doing and they are doing an enormous amount of work; the French people especially are spending large amounts of money and training a great many men.

OPERATION AND MAINTENANCE OF FIRE CONTROL, INSULAR POSSESSIONS.

Mr. SHERLEY. On page 24 is an item, "For operation and maintenance of fire-control installations at seacoast defenses," in the insular possessions. The estimate is for \$20,000.

Gen. ALLEN. That was estimated the same way as in the United States. We have spent for the insular possessions \$189,697.42. The first appropriation for maintenance was last year, or made in 1910, \$20,000, and in 1911, \$20,000.

Mr. SHERLEY. What is the state of your Treasury balances?

Gen. ALLEN. We have about \$7,000 left out of that fund available for still further work.

Mr. SHERLEY. What do you mean by "work"?

Gen. ALLEN. Oh, you are speaking about maintenance. Well, we have not any balance; it was all spent up to the last fiscal year.

Mr. SHERLEY. Will you put a statement in the hearing as to the state of the Treasury balances?

Gen. ALLEN. Yes, sir. There remains of this appropriation for the present fiscal year \$1,069.22 unallotted and available for current expenses.

Mr. SHERLEY. It is estimated that you can get along on the same fund this next year?

Gen. ALLEN. Yes, sir.

Mr. GOOD. General, do you keep any careful account as to whether the appropriation is spent for maintenance or operation, or do the two intermingle?

Gen. ALLEN. They go together; we do not differentiate those.

Mr. GOOD. You do not know, in any of these appropriations, just how much you spend for operation as separate from what you spend for maintenance?

Gen. ALLEN. No.

Mr. SHERLEY. But you do actually know what you spend for operation; but operation itself is really, in its true sense, a maintenance expenditure?

Gen. ALLEN. Yes; they all go together. Of course, we could keep books in any way that you might desire, and we try to keep them so as to answer every question, but we keep about as many records as we can with the force we have at our disposition, and in some cases it is a question whether it is worth while to go into any more detail.

UNDER THE COAST ARTILLERY.

STATEMENT OF BRIG. GEN. E. M. WEAVER, CHIEF OF COAST ARTILLERY, ACCOMPANIED BY CAPT. STANLEY D. EMBICK, ASSISTANT, UNITED STATES ARMY.

PERSONNEL OF CORPS.

Mr. SHERLEY. You are in the Coast Artillery Corps of the Army?

Gen. WEAVER. Yes.

Mr. SHERLEY. What is the present strength of that corps?

Gen. WEAVER. The authorized strength is 715 officers and 19,321 enlisted men; the actual strength is about 70 officers and 2,000 enlisted men less.

Mr. SHERLEY. What is the estimated strength that will be required to man the guns that are at present erected in continental United States?

Gen. WEAVER. 1,540 officers and 42,395 enlisted men for the United States proper, for one complete manning detail, including mines, power, and light; the total number for the United States, Panama, and the insular possessions is 1,689 officers and 45,893 enlisted men. We have now about 20,000 officers and men. There is therefore a total deficiency of about 27,000 officers and men. We hope eventually to have about 20,000 officers and men from the State militia Coast Artillery forces; there are now only about 7,200 officers and men of the State militia.

Mr. SHERLEY. What proportion of those men would require special training?

Gen. WEAVER. You mean high-class men?

Mr. SHERLEY. Yes. What I am trying to arrive at is, in case of need to man all of these guns what part of that need could be supplied from volunteers or men without any previous training of any moment?

Gen. WEAVER. Our range sections—that is, men trained to determine ranges—the men charged with the handling of the power, light, and communications, the men we know as our graded men and our Artillery specialists, receive special instruction, and they could not be supplied readily from volunteers. We are now endeavoring to develop a class of trained coast artillerymen among the militia of the seaboard States.

Mr. SHERLEY. I mean exclusive of that class.

Gen. WEAVER. Well, those men who are simply engaged in handling the guns, giving elevation and direction right and left, and handling projectiles, need not be high-class men; but those who have to do with determining the precise range and transmitting to the gun the conditions of exact range are high-class men, those who have to do with developing power for our searchlights are high-class men, and those who have to do with the communications are high-class men. All are high-class men, so to speak, except those who are merely engaged in moving the heavy projectiles and powder and in giving motion to the guns.

Mr. SHERLEY. What proportion do the two classes bear to each other?

Gen. WEAVER. Approximately 40 per cent are high-class men.

ESTIMATES.

Mr. SHERLEY. The estimates for the fortification bill, as submitted to Congress, are originally prepared in the Office of the Chief of Artillery?

Gen. WEAVER. We prepare those pertaining to fire control particularly, and go over and coordinate those of the Engineer, Ordnance, and Signal Corps which have to do with furnishing supplies for Coast Artillery purposes.

Mr. SHERLEY. The general scheme of fortification, as proposed in the bill, is outlined in the Office of the Chief of Artillery, is it not?

Gen. WEAVER. Yes. Of course you do not refer to that broad determination by the Taft Board?

Mr. SHERLEY. No. I appreciate that at first we had the Endicott Board and then the Taft Board, and that in a large measure the present plan is simply the carrying out of those fundamental policies.

Gen. WEAVER. Yes.

Mr. SHERLEY. But in the detail of appropriation, as, for instance, how much generally shall be done in the way of ordnance for continental United States and how much for the insular possessions, the scheme is prepared in the Office of the Chief of Artillery?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. Then the detailed estimates that may be necessary to supply the particular things deemed requisite by the Artillery Corps are determined by the branches of the service that deal directly with them?

Gen. WEAVER. Yes, sir; that is right.

Mr. SHERLEY. Now, in the planning of the estimates in this bill, what was the general scheme outlined as to the fortifications for the United States and the insular possessions? Perhaps my question would be more clear if I made this suggestion: You are asking, as I recall, nothing in the way of ordnance for continental United States?

Gen. WEAVER. No; nothing at all. The only ordnance we are asking for are some 6-inch guns and 3-inch guns in Hawaii to complete the fortifications at Pearl Harbor, but nothing in the United States proper.

FIRE CONTROL IN THE UNITED STATES.

Mr. SHERLEY. Now, as to fire control in the United States; what is the proposed plan as to that?

Gen. WEAVER. You know, we are introducing what is known as the standard installation; before that we had what was known as the provisional installation. The two systems accomplish the same results. The principal difference between the two is that in the standard installation all the wires are placed underground, where they can not be cut by the projectiles of the enemy's guns, and the instruments are installed in substantial buildings, whereas with the provisional installation the wires are exposed and the instruments are placed in temporary structures. With the appropriations which Congress has already made we have been enabled to complete the standard installation on the Atlantic coast down to and including New York, with the exception of Portsmouth, New Bedford, and Narragansett Bay, and on the Pacific coast down to and including San Francisco; that is, Puget Sound, the mouth of the Columbia River, and San Francisco Bay.

FIRE CONTROL, FORT BALDWIN, KENNEBEC RIVER.

Mr. SHERLEY. Now, coming back to Kennebec River, on the Atlantic coast; am I to understand that there you have a permanent fire-control system?

Gen. WEAVER. No; I only included those places that are garrisoned. Fort Baldwin, Kennebec River, is an ungarrisoned reservation. There is some modern armament there, but the Coast Artillery has nothing to do with it at the present time.

Mr. SHERLEY. I have here a statement, prepared by the War Department, showing the estimated amounts required to complete fortifications, and the statement shows, for instance, fire control at Kennebec River, \$3,200.

Gen. WEAVER. That is part of the estimates of the Taft Board, I believe, and we have not taken that up as yet.

FIRE CONTROL, PORTLAND, ME.

Mr. SHERLEY. Well, now, at Portland there appears an estimate for \$25,000 for fire control.

Gen. WEAVER. Well, my understanding is that Portland is entirely completed.

Capt. EMBICK. That is for the additional defenses contemplated by the Taft Board.

Gen. WEAVER. That is for some additional defenses that have not been constructed, but contemplated by the Taft Board and modifying the Endicott Board's project to some extent and introducing some additional fortifications.

Mr. SHERLEY. And the Taft plan itself has been modified from time to time?

Gen. WEAVER. It has; yes, sir.

Mr. SHERLEY. So that Portland, so far as existing armament is concerned, has a complete standard fire-control system?

Gen. WEAVER. Yes, sir; it has.

FIRE CONTROL, PORTSMOUTH, N. H.

Mr. SHERLEY. Now, at Portsmouth—

Gen. WEAVER (interposing). Portsmouth has only the provisional installation; we have recently acquired land there on which it is contemplated building a two-company post. The modern fortification there is at Fort Stark, a little to the south of old Fort Constitution. There is a modern fortification, Fort Foster, on the other side of the entrance to Portsmouth. Fort Foster and Fort Stark are not garrisoned. There is one company at Fort Constitution, but there is no armament at Fort Constitution except two 8-inch guns. We do not contemplate doing anything there at the present time. The garrison will eventually serve the armament at Fort Stark.

Mr. SHERLEY. But the guns that are there now are supplied with fire control, are they not?

Gen. WEAVER. There is a provisional system there, simply a plotting board and observing instruments; the system can be worked with a very simple equipment.

Mr. SHERLEY. Is the equipment there sufficient to enable you to use the guns in the event of war?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. Could it be used in time of war in the event the system itself was not in any way interfered with by the enemy?

Gen. WEAVER. Yes; it could be used, but it could not be used to full advantage; we could not derive the full advantage of the armament.

FIRE CONTROL, BOSTON, MASS.

Mr. SHERLEY. At Boston—

Gen. WEAVER (interposing). Boston is completed.

Mr. SHERLEY. For Boston an estimate appears for \$125,000; that, I presume, is in view of additional armament there?

Gen. WEAVER. I presume so; anything of that kind, my understanding is, would be for a modification recommended by the Taft Board.

FIRE CONTROL, NEW BEDFORD, MASS.

Mr. SHERLEY. Now, at New Bedford.

Gen. WEAVER. Nothing has been done there.

Mr. SHERLEY. Is there any armament there?

Gen. WEAVER. There are two 8-inch, two 5-inch, and four 3-inch guns and some 6-pounders; it is minor armament.

Mr. SHERLEY. Is there any fire control there?

Gen. WEAVER. There is a provisional system there that can be used.

FIRE CONTROL, NARRAGANSETT BAY.

Mr. SHERLEY. At Narragansett Bay what is the condition of the fire control?

Gen. WEAVER. There is a provisional system there. It is planned to take this locality up next for installation of the standard system. Our estimate is for \$200,000, to begin the installation of a standard fire-control system at Narragansett Bay.

Mr. SHERLEY. It is estimated that the total cost of Narragansett Bay will be \$616,861.

Gen. WEAVER. Well, that estimate is thought to be excessive; it is thought that \$200,000 will go a considerable ways in providing the standard installation.

Mr. SHERLEY. That is simply the estimate that was arrived at by the Taft Board at the time the general scheme was made up?

Gen. WEAVER. Yes, sir; that is the Taft Board estimate. The tendency has been to reduce those estimates as we go along, to find improvements and methods of doing the work just as well with less expense. This is being carefully considered; the tendency has been in all these cases, in regard to fire control particularly, to reduce the estimated cost.

Mr. SHERLEY. Are you in a position to state what you think the total installation will cost?

Gen. WEAVER. I can not state what the complete cost will be. It is thought that all of these estimates are excessive, and in this instance it is thought that \$200,000 will provide the more important features of the installation.

Mr. SHERLEY. That would indicate that the estimate, then, was about three times as great as will be needed?

Gen. WEAVER. Yes, sir. I note that the estimated amount required for existing defenses is \$572,000.

Mr. SHERLEY. The difference between that and \$616,861, then, is in regard to the additional armament that it is expected might at some time be put there?

Gen. WEAVER. Yes, sir.

CHANGES IN EXISTING SCHEME OF COAST DEFENSE.

Mr. SHERLEY. Right in that connection, before passing to these other places, is it not true that at the present time the Atlantic coast and the Pacific coast, excluding the lower mouth of the Chesapeake and, perhaps, near Los Angeles, on the Pacific side, are what might be almost said to be overfortified?

Gen. WEAVER. Yes. I think, personally, there are some fortifications that we really do not need.

Mr. SHERLEY. And yet, in view of that fact, there are still additional estimates looking to additional fortification work on the two shores?

Gen. WEAVER. Well, I think, like everything else, coast defense has been an evolution. The views of the experts in times past were different from those held at present. For example, the fortifications below Washington, down the river here, when they were put there the draft of warships would perhaps have permitted some battleships to come up the river, but now I do not believe any battleship or cruiser would attempt it.

Mr. SHERLEY. Considering that the present condition seems not only to be unsatisfactory, but in some instances more than necessary, the fact that in a statement only a few months old there are estimates submitted for additional armament in continental United States is rather striking.

Gen. WEAVER. Well, I think that the position is this: That further consideration of the defense of the whole coast line of the United States has indicated that there are points that should be defended that were not defended under the Endicott system. For example, the Endicott Board did not contemplate defending the eastern entrance to Long Island Sound; the only defense it provided for the eastern entrance to New York was four 12-inch guns at New London; it was found out afterwards that the eastern entrance could be defended at the Race, and that modification was made.

Mr. SHERLEY. While that would be an explanation as to certain points, increased armament seems to be asked practically for every place now fortified on either the Atlantic or Pacific coasts.

Gen. WEAVER. Well, I do not quite understand that. My idea is that with regard to some of the new points to be fortified, the guns could be shifted from places that are now fortified, and that these latter fortifications could be abandoned.

Mr. SHERLEY. With the exception of several places on the Atlantic coast and the Pacific coast, every other place has an estimate of an amount that will be needed for the construction of emplacements, which would indicate additional armament.

Gen. WEAVER. I presume those are modifications that are provided by the Taft Board.

Mr. SHERLEY. Would it not seem, in view of the present condition, that we need to modify the Taft Board's estimate by the elimination of a lot of these estimates?

Gen. WEAVER. We have talked about that, and we had proposed to do that at some time when we have completed the study ourselves. I have not been in the office long enough to take that question up only in a general way. But my view is that the recommendations of the Taft Board may be modified in the way of reducing the fortifications.

FIRE CONTROL, LONG ISLAND SOUND.

Mr. SHERLEY. Now, returning to the estimates submitted in this general statement for fire control at these various places, I find that for Long Island Sound there appears an estimate of \$200,000. Is that for existing armament, or is it in contemplation of increased armament?

Gen. WEAVER. That is for additional armament.

Mr. SHERLEY. What is the condition of the fire control there now as to existing armament?

Gen. WEAVER. We have practically completed it. There are some balances remaining which will enable us to complete it.

Mr. SHERLEY. You mean complete a modern system?

Gen. WEAVER. Yes, sir.

FIRE CONTROL, EASTERN NEW YORK.

Mr. SHERLEY. Now, eastern New York.

Gen. WEAVER. That is completed.

Mr. SHERLEY. The estimate is \$19,500, and that would be for additional armament, would it?

Gen. WEAVER. Yes, sir.

FIRE CONTROL, SOUTHERN NEW YORK.

Mr. SHERLEY. And at southern New York there is an estimate of \$50,000.

Gen. WEAVER. That is for the same. If there is anything there it must be for additional fortifications recommended by the Taft Board.

Mr. SHERLEY. They are practically completed with a modern standard system?

Gen. WEAVER. For guns now mounted, the standard system is complete.

FIRE CONTROL, DELAWARE BAY.

Mr. SHERLEY. For the Delaware there appears an estimate of \$238,110.

Gen. WEAVER. We have not taken that up yet. That will probably be one of the last places at which we will recommend to have the standard installation placed.

Mr. SHERLEY. You have guns there now?

Gen. WEAVER. Yes; there is a strong defense there. That is another case where guns have been placed far up a river; it is about 90 miles from the mouth of the river.

Mr. SHERLEY. What system of fire control have you there?

Gen. WEAVER. We have the provisional system there.

Mr. SHERLEY. It is sufficient for use?

Gen. WEAVER. Yes; we can use it effectively.

FIRE CONTROL, BALTIMORE, MD.

Mr. SHERLEY. For Baltimore there is an estimate of \$262,097. What is the condition at Baltimore?

Gen. WEAVER. We have the provisional system there; the guns can be used with the system now installed there.

Mr. SHERLEY. And this estimate is for a standard system for existing armament?

Gen. WEAVER. Standard installation for the existing armament, and if the Taft Board has recommended any additional there, it is for that also.

Capt. EMBICK. The Taft Board recommended a small addition to the armament.

FIRE CONTROL, FORTS WASHINGTON AND HUNT.

Mr. SHERLEY. Washington has an estimate of \$54,866.

Gen. WEAVER. That is for the defenses 10 miles down the river, at Forts Washington and Hunt.

Mr. SHERLEY. What is the system there?

Gen. WEAVER. We have a provisional system there which is sufficient for all present purposes.

FIRE CONTROL, HAMPTON ROADS.

Mr. SHERLEY. For Hampton Roads there is no estimate. Have you a standard system there?

Gen. WEAVER. No; but we have money available for that. We expect to take that up this year and install a standard system there during the present year.

Mr. SHERLEY. They now have a temporary system?

Gen. WEAVER. The provisional system.

Mr. SHERLEY. Fort Monroe is one of the forts at Hampton Roads?

Gen. WEAVER. Yes; it is the defense there—Fort Monroe and Fort Wool.

Mr. SHERLEY. You have there a school of instruction?

Gen. WEAVER. Yes; the Coast Artillery School for officers and enlisted men is located at that point.

FIRE CONTROL, CAPE HENRY, CHESAPEAKE BAY.

Mr. SHERLEY. For Chesapeake Bay there is an estimate of \$100,000 for fire control, but at present there are no fortifications at all.

Gen. WEAVER. Yes, sir; that is right; that is at Cape Henry.

FIRE CONTROL, CAPE FEAR.

Mr. SHERLEY. At Cape Fear there is an estimate of \$172,401.

Gen. WEAVER. That is for the existing armament.

Mr. SHERLEY. What system have you there now?

Gen. WEAVER. We have a provisional system there. We have a provisional system at all of these places. The only difference between the two is the character of the communications, the buildings for housing instruments, the kinds of platting boards, observing instruments, and computing devices.

Mr. SHERLEY. In efficiency of control, excluding the danger of interruption by the enemy's fire, there is no difference?

Gen. WEAVER. It is efficient—not, of course, as thoroughly efficient as the standard system measured by hits per gun per minute.

FIRE CONTROL, CHARLESTON, S. C.

Mr. SHERLEY. Now, at Charleston there is an estimate of \$191,925. Is that for existing armament?

Gen. WEAVER. I am not familiar with the Taft Board's scheme at that place.

Capt. EMBICK. Yes; that is for existing armament.

Mr. SHERLEY. You have there only a provisional system?

Gen. WEAVER. Yes, sir.

FIRE CONTROL, PORT ROYAL.

Mr. SHERLEY. At Port Royal there is no estimate for fire control.

Gen. WEAVER. We have abandoned that point. That fortification has been abandoned as one of the units of our coast-defense system.

FIRE CONTROL, SAVANNAH.

Mr. SHERLEY. Now, at Savannah there is an estimate of \$189,952.

Gen. WEAVER. We have there a provisional system for existing armament.

Mr. SHERLEY. In passing, I suppose it would be accurate to say that all of these estimates are now viewed as excessive, due to the economies which you are making in installation?

Gen. WEAVER. I believe that to be true, sir.

Mr. SHERLEY. And they represent not estimates based on present experience, but estimates that were made by the Taft Board at that time?

Gen. WEAVER. Yes, sir.

FIRE CONTROL, KEY WEST.

Mr. SHERLEY. At Key West there is an estimate of \$281,182?

Gen. WEAVER. We have there a provisional system, and that estimate is for the standard system.

Mr. SHERLEY. Well, perhaps we can save time, General, by having you file full information as to each of these places in the notes.

Gen. WEAVER. You would like to have me put in the estimates of the Taft Board for fire control and the estimates for the existing armament?

Mr. SHERLEY. Although I have it in another form, I would be very glad to have it in the record in full in connection with the fire control. Can you state how much money has been expended or appropriated for fire control in continental United States?

Gen. WEAVER. I will put it in my hearing.

[NOTE 1.—The estimated amounts required to complete the standard fire-control installations for existing defenses for home ports and the supplemental amounts required for the additional defenses recommended by the Taft Board are as follows:

	For existing armament.	For projected armament.		For existing armament.	For projected armament.
Kennebec River.....	\$3,200		Savannah.....	\$189,952	
Portland.....		\$25,000	Key West.....	281,182	
Portsmouth.....	140,473	58,530	Tampa.....	250,143	
Boston.....		125,000	Pensacola.....	218,057	
New Bedford.....	181,050		Mobile.....	388,877	
Narragansett Bay.....	572,500	44,361	New Orleans.....	160,640	
Long Island Sound.....		200,000	Galveston.....	247,055	
New York.....		69,500	San Diego.....	99,635	
Delaware.....	238,110		Los Angeles ¹		\$100,000
Baltimore.....	262,097		San Francisco.....		50,000
Potomac River.....	54,866		Columbia River.....		25,000
Chesapeake Bay.....		100,000	Puget Sound.....		150,000
Cape Fear River.....	172,401				
Charleston.....	191,925			3,652,163	947,391

¹ Not included in report of Taft Board.

For the majority of the localities listed above, the figures given are the estimates for fire control embodied in the report of the Taft Board; for the remaining localities the figures given are revised estimates and are less than the estimates of that board. Recent developments and improvements in fire-control matériel will permit, it is believed, a more radical revision downward of all these estimates, and a restudy of all fire-control projects will be undertaken during the current year with a view to such revision.

2. On account of the fact that until recent years appropriations for fire control were not carried in a single item in the appropriation bill, and in some cases were applicable for the purchase of matériel other than Coast Artillery fire-control matériel, it is not practicable, at present to state the exact total appropriated for fire control for continental United States. It can be stated, however, that \$6,500,000 is a close approximation to this total.]

Mr. SHERLEY. I would be glad if you could do so, and if in that connection you could state how much has been expended for what you now designate as provisional fire control, I wish you would do so.

Gen. WEAVER. Yes, sir.

[NOTE.—It is impracticable at present to segregate past expenditures for provisional systems from those for standard systems, but an effort will be made to accomplish this during the current year.]

PROVISIONAL AND MODERN FIRE CONTROL.

Mr. SHERLEY. And I would like to ask you this: In changing from the provisional to the standard system I assume that much of the work done under the provisional system is well adaptable and is used in putting in the standard system?

Gen. WEAVER. Yes, sir; the material, but not much of the work.

Mr. SHERLEY. I did not mean work, except in the sense of material?

Gen. WEAVER. Yes.

Mr. SHERLEY. What is usually the increased cost, or the percentage of cost, in transferring from a provisional system to a standard system?

Gen. WEAVER. I do not believe that there is any common measure that you could arrive at; it depends so much on the locality and amount of work in each locality. The chief expense is in changing from an aerial line to a conduit line and shifting from framework to concrete housing. I can give you in actual cases what it has cost to install the provisional system and what it has cost to pass from that system to the standard system.

Mr. SHERLEY. If you could give some one or two cases, that would be enough.

Gen. WEAVER. That would be as near as I could answer your question with any trustworthiness.

[NOTE.—The estimated cost of the provisional system at Fort Monroe, Va., is approximately \$150,000, and the cost of converting this system to the standard system is estimated to be approximately \$100,000. The provisional system at Fort Monroe, however, approaches more closely the standard system than is generally the case and therefore, as a rule, the cost of converting the provisional into the standard system will be a greater percentage of the total cost than is the case at Fort Monroe.]

Mr. SHERLEY. If it would not take too much time, could you briefly state just what a modern fire-control system consists of, in order that the record may show it?

Gen. WEAVER. Yes. A fire-control system consists of two essential features; one is the accurate determination of the range and position of any naval target before our fortifications, and the other is a system of communications going to the battery units that will enable the artillery commanding officers to have perfect control over the fire. That is, one feature is position finding and the other is control of fire. For example, if a squadron consisting of a number of ships comes against any of our fortifications, the commanding officer can place the fire of all of the battery units on one ship or can distribute the fire on the several ships; the concentration and distribution of fire is completely in the hands of the Artillery commander. The units of the Coast Artillery are the battery, consisting of two or more guns of the same caliber, commanded by a captain; two or more batteries are grouped together into what is known as a fire command, commanded by a major or lieutenant colonel; and then two or more fire commands are grouped together into what is known as a battle command, commanded by a higher officer. In that way we have a line of command running up to the battle commander, who is the highest commander, controlling coast artillery fire in action. Would you like to have me explain the system of range finding?

Mr. SHERLEY. Yes.

Gen. WEAVER. We have two methods of finding the ranges. One is known as the vertical base system and the other is known as the horizontal base system. The vertical system can only be used where we have a certain height above tidewater, and instruments have been devised for the solution of a vertical right-angle triangle. The telescope is hinged at its forward point—the object-glass end. The eye end of the telescope may be raised or lowered in following a moving object on the water. This movement of the eye end of the telescope changes the angular relations. One triangle is at the instrument and the other out over the water to the object. There are thus two similar triangles, and simple geometrical and trigonometrical relations enable us to convert the small motion involved in the

raising and lowering of the eye end of the telescope into the range. That is the vertical system of determining ranges. Now, in the horizontal base system, which is used along a low coast line, there are two observing instruments, one at each end of a carefully measured line of from 1,000 to 2,000 yards long. An observer operates each instrument. There is telephonic communication between each of these two observers and men at a plotting board at the battery. The observers observe the target at the same instant, and they telephone the readings of their respective instruments to the men at the plotting board. These latter lay down on the plotting board the angles as observed by the observers, and thus locate on the plotting board the position of the target. The observations are made every 15 seconds, so that the position of the target is plotted on the plotting board every 15 seconds. In order not to delay the men at the guns a prediction is made, after two observations have been plotted, as to where the target will be plotted 30 seconds ahead; that is, we predict the position of the target on the plotting board 30 seconds in advance, and we make all aiming corrections for the wind, for atmosphere, etc., in connection with this prediction, and then transmit this information to the guns, so that the men at the guns have the range of the target and the aiming corrections a little in advance always of the present time, so that they may go on and load as rapidly as they can, and whenever they are ready for the range it is posted in plain view and they can utilize it.

All this is made possible by a system of telephony in connection with the two observers who are in telephonic communication with the plotting board which enables information immediately to be transmitted to the plotting board. Within 10 seconds after the observations are made the corrected range is displayed at the guns. I do not know how fully you would like to have me go into this, but what I have said explains in outline the features of our system. They consist of, first, the determination accurately of the position of the target every 15 seconds, and giving advanced information to the guns as to the range, so that accurate fire may be made, and, second, a system of placing all of the units of the defense under the control of higher officers for concentration and distribution of fire in an action against a naval enemy.

Mr. SHERLEY. Now, the mortars are always, of course, aimed mechanically by virtue of the information thus obtained?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. And the guns usually are?

Gen. WEAVER. Well, the only difference between guns and mortars is that in the case of mortars we send down two sets of data, one for range, and the other the horizontal angle—the azimuth. We can fire guns in the same way, of course, because the traverse circles are graduated just as they are for mortars, but the usual way of firing guns provides that one man shall look over the crest of the parapet and give the direction to the gun. This man is called the gun pointer, and has a telescopic sight.

Mr. SHERLEY. There is one man who always actually sights at the gun?

Gen. WEAVER. Yes.

Mr. SHERLEY. And for mortars it is all done through information furnished; that is, it is mechanically done?

Gen. WEAVER. Yes. There is one difference between guns and mortars which may be of interest; a mortar will not cover the entire range in front of the battery with any single charge of powder, and as a consequence a number of charges of powder have to be used; that is, one charge of powder will carry the projectile, say, from 2,000 yards out to 4,000 yards; then another charge of powder has to be used that will carry it out still farther, and then another, and so on. These range limits fixed by the different powder charges constitute what are called mortar zones, and the information which goes down to the battery from the plotting board in the case of mortars shows in what zone the target is, so that the ammunition detachment can determine what charge of powder to use.

Mr. SHERLEY. What length of time does it take to install a modern fire-control system?

Gen. WEAVER. It took about a year for Boston, Puget Sound, and San Francisco. It takes the better part of a year to make an installation in a large artillery district.

Mr. SHERLEY. Is that due to the time needed for the installation proper, or is it due to time required to obtain the necessary apparatus and material?

Gen. WEAVER. Well, I am not sure as to what the relative values of those two factors are. My understanding is that out in Puget Sound, where there was a great deal of rock excavation and blasting for the conduits, a relatively large time was given to the work.

Mr. SHERLEY. The reason for this question is that it appears in a hearing of some years ago that Mr. Smith, the then chairman of the subcommittee, suggested to Gen. Murray that it might be good policy on the part of the War Department to expend the moneys that were furnished in supplying itself with the material that would be necessary, so that in case of emergency the only delay might be in installation. Now, has that practice been followed at all by the department?

Gen. WEAVER. I do not know. Perhaps Capt. Embick can state.

Capt. EMBICK. To some extent.

Mr. SHERLEY. What is the condition as to material on hand that might be necessary in case of emergency?

Gen. WEAVER. The greater part of the material has been accumulated.

Mr. SHERLEY. Perhaps that is no longer important, in view of the fact that you have provisional fire control at all of these stations.

Gen. WEAVER. As to the time I spoke of, Mr. Chairman, I had in mind the early stages of this standard installation; at that time a lot of material had not been developed. I think the Signal Corps and the Ordnance Department have since developed the types. My impression is that there would be but little delay in supplying that material—very little delay.

Mr. SHERLEY. General, the estimates as to moneys needed for submarine mines are directly made by your corps?

Gen. WEAVER. Yes, sir.

SUBMARINE MINES.

(See also p. 153.)

Mr. SHERLEY. On page 19 of the bill there is an estimate "For the purchase of submarine mines and necessary appliances to operate them for closing the channels leading to our principal seaports, and

continuing torpedo experiments; for the purchase of the necessary machinery, tools, and implements for the repair shop of the torpedo depot at Fort Totten, N. Y., and for extra-duty pay to soldiers necessarily employed for periods not less than 10 days on work in connection with the issue, receipt, and care of submarine mining material at the torpedo depot, \$150,000." That is the same estimate that was asked last year and the same as the appropriation of last year.

Gen. WEAVER. That includes \$58,000 as a maintenance item and \$92,000 for the purchase of additional supplies.

Mr. SHERLEY. There has never been any separation in the item of the maintenance charge and the sums for material proper?

Gen. WEAVER. No, sir.

Mr. SHERLEY. What is the value of the property that you now have and in maintaining which you now spend \$58,000?

Gen. WEAVER. About \$4,000,000.

Mr. SHERLEY. What is the state of the Treasury balances, General, under this item?

Gen. WEAVER. You mean what amount we now have on hand of last year's appropriation?

Mr. SHERLEY. Or of any previous appropriation.

Gen. WEAVER. On December 31, 1911, the Treasury balance of the appropriation, "Submarine mines," was \$211,384.58; the actual obligations which had been incurred amounted to \$103,195.72, leaving unobligated \$108,188.86. All of which, however, has been allotted several months ago to the purchase of material which will shortly be contracted for.

Mr. SHERLEY. In a statement furnished to the chairman of the committee I find this language:

The appropriations for submarine-mine matériel during and since 1902 aggregate \$2,452,060, of which amount there has been expended on continental United States the sum of \$1,862,316.04, and the balance, \$589,743.96, has been expended on the insular possessions.

Gen. WEAVER. I know that Gen. Murray had a tabulated statement showing precisely how the money for mines and mining matériel had been expended.

Mr. SHERLEY. Now, the statement further shows that there has been expended at the "Torpedo depot (administration), \$59,998.50."

Gen. WEAVER. That is for the administrative expenses, for clerks and packers and preparation of matériel for shipment.

Mr. SHERLEY. Can you indicate in your notes the extent of the force that you have engaged in that and the cost of the same?

Gen. WEAVER. Yes; the clerical force and laborers at the torpedo depot consists of: One clerk, at \$1,600 per annum; 1 clerk, at \$1,300 per annum; 1 clerk, at \$1,100 per annum; 1 storekeeper, at \$1,200 per annum; 1 packer, at \$840 per annum; 1 packer, at \$840 per annum; total, \$6,880 per annum.

Mr. SHERLEY. I would like a verification of the statement made by me as to the total that has been expended for submarine-mine matériel.

Gen. WEAVER. \$1,802,317.54.

Mr. SHERLEY. Well, if you are satisfied that the statement made here is a correct statement, it requires no further explanation.

Gen. WEAVER. That is since 1902, when it was turned over to the Coast Artillery by the engineers.

Mr. SHERLEY. What is the character of the supplies and the buildings for which this maintenance fund is expended?

Gen. WEAVER. It is the mines, anchors, cables, ropes, chains, case-mate apparatus, explosive, all the accessory matériel and small parts used in mining as well as the necessary paints, oils, and preservatives for the large amount of matériel.

Mr. SHERLEY. They are all housed?

Gen. WEAVER. They are housed in various places at the fortifications.

Mr. SHERLEY. Does the maintenance sum of \$58,000 cover the cost of the maintenance of these buildings, or is that taken out of another fund?

Capt. EMBICK. Another fund, sir. There is a separate item for the maintenance of torpedo structures; this is just for replacing mine matériel damaged in actually putting them down and taking them up, as well as the amount of matériel actually used up in giving instruction to the 43 mine companies.

Gen. WEAVER. My understanding of it is that the \$58,000 is simply in connection with the instruction work, the cost of keeping the Coast Artillery mining personnel instructed, and in replacing the matériel that is damaged during the year.

Mr. SHERLEY. The \$58,000, then, can not be simply called a maintenance item, because it is for the expenses incident to the instruction given in the use of explosives?

Gen. WEAVER. My understanding is it is the replacement of the matériel that is used in giving instruction and for the care and preservation of the matériel on hand.

Mr. SHERLEY. Well, in what case, in connection with the instruction, is that borne under this item?

Capt. EMBICK. It is the replacement of matériel that becomes damaged.

Gen. WEAVER. That is, cables, mines, and all matériel that is used in the course of the instruction during the year.

Mr. SHERLEY. Including the cost of making the explosion itself?

Capt. EMBICK. Yes, sir.

Mr. SHERLEY. What is the present condition as to mine matériel for continental United States—are you pretty well supplied?

Gen. WEAVER. We are well supplied; yes, sir.

Mr. SHERLEY. The estimate submitted contemplates the expenditure of about \$92,000 for additional supplies?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. This is for continental United States.

Gen. WEAVER. The \$92,000 is for the purchase of new material. The total amount that is necessary for the completion of projects in the United States is \$1,036,505.

Mr. SHERLEY. By the completion of projects you simply mean the purchase of additional mine equipment?

Gen. WEAVER. Yes, sir; mine equipment for the different places.

Mr. SHERLEY. And this equipment is distributed at the different fortifications?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. And at present you consider yourself pretty well supplied with mine equipment?

Gen. WEAVER. We are fairly well equipped. We need \$1,036,505 to complete the mine material of the United States.

Mr. SHERLEY. Of this item, then, \$58,000 might be considered as merely necessary in the way of maintenance?

Gen. WEAVER. Yes, sir; we would like to have that particularly, otherwise it will handicap us in keeping our mining companies thoroughly up in their instruction.

Mr. SHERLEY. We have now concluded the items—that is, of continental United States—that directly pertain to the Chief of Coast Artillery?

Gen. WEAVER. Yes, sir.

CONSTRUCTION OF MINING CASEMATES, CABLE GALLERIES, ETC., PHILIPPINE ISLANDS.

(See also p. 150.)

Mr. SHERLEY. On page 24 of the bill appears an item "For construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines, and their accessories at the defenses of the Philippine Islands, \$67,000." That money, however, is expended under the Engineer Department and the estimate is simply submitted through your office?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. We have already had an examination of Col. Burr as to this item, unless there is something you would like to suggest.

Gen. WEAVER. We are very much in need of a wharf out there. It includes \$55,000 for a wharf and \$34,000 for a tramway at Corregidor, connecting across from the north to the south side of the island, in order to make thoroughly available the mining material at that point. There is \$22,000 now available for that. This \$67,000 is necessary to complete that particular construction.

REPAIR AND PROTECTION OF DEFENSES, FORT ST. PHILIP, NEW ORLEANS, LA.

Mr. SHERLEY. General, there are various items submitted by the engineers as to expenditures at various forts in continental United States. The condition of the defenses in the United States are all reported directly to your office, so that you are in a position to state as to the physical condition of, for instance, the fortifications at Fort St. Philip, La.?

Gen. WEAVER. We have information as to that; that information comes from our own officers.

Mr. SHERLEY. I say, that report is made directly to the Chief of Coast Artillery?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. And he knows the condition of each of these fortifications—the physical condition?

Gen. WEAVER. Yes, sir; we have our Artillery district commanders make inspections as to the condition of fortifications.

Mr. SHERLEY. Now, there is an item on page 7 of the bill, "Repair and protection of defenses of New Orleans, La.: For rebuilding and

strengthening the levees for the protection of the site of the defenses and the garrison post at Fort St. Philip, La., \$16,000." How badly needed is that money and what is the condition of that fort, as you know it?

Gen. WEAVER. My understanding of that particular item is that it is rather necessary in order to make the locality of Fort St. Philip habitable for troops.

Mr. SHERLEY. That condition has been there for some time?

Gen. WEAVER. Yes; it has been there for some time. Fort St. Philip is not garrisoned now; there is simply a caretaking detachment there.

Mr. SHERLEY. There is no more necessity for its appropriation now than there was last year?

Gen. WEAVER. I think not; at least I have no information otherwise.

DEFENSES AT FORT MOULTRIE, CHARLESTON, S. C.

(See also p. 37.)

Mr. SHERLEY. The next item is "For installation and replacement of electric light and power plants and for improvement of ammunition service at the seacoast fortifications for the defenses of Charleston, S. C., the Secretary of War is authorized to apply the sum of \$8,992 remaining unexpended from the appropriation for the construction of about 4,800 linear feet of wall necessary for the protection of Fort Moultrie, Sullivan's Island, S. C., from the effects of storms, contained in the fortification appropriation act approved May 27, 1908." That is a matter that would come more peculiarly under the Signal Corps and the Engineer Department, would it not?

Gen. WEAVER. Yes. The engineers have the work of installation, and then the material is turned over to us for use.

Mr. SHERLEY. What is the condition of the defenses at Charleston, S. C.; that is, what is the condition of the power plants and the ammunition service there?

Gen. WEAVER. There is need of additional installation there, though it has not been included in any special estimate. My understanding of this item is that there is a balance there that the engineers would like to utilize.

Mr. SHERLEY. Then the only reason for suggesting an expenditure of money at this particular place is the fact that a balance exists for work already authorized at that place?

Gen. WEAVER. Yes; that is the reason, I think.

Mr. SHERLEY. In the absence of a balance this place would not be suggested as one where it was specially desirable to expend this money?

Gen. WEAVER. Not in comparison with other places.

Mr. SHERLEY. So if that balance were to be made available it could be better used at other places?

Gen. WEAVER. Or in a general way; that is, not have it available for that particular locality, but have it made available where the urgency of the installation is most apparent.

PURCHASE AND INSTALLATION OF SEARCHLIGHTS, FORTS PICKENS AND
M'REE, PENSACOLA HARBOR.

(See also p. 40.)

Mr. SHERLEY. Now, the next item is, "For the purchase and installation of searchlights, for installation and replacement of electric light and power plants, and for improvement of ammunition service at the seacoast fortifications at the defenses of Pensacola Harbor, Fla., the Secretary of War is authorized to apply such balances as may remain available from the appropriation for building sea walls for the protection of the sites of the fortifications and of the necessary post buildings at Forts Pickens and McRee, Pensacola Harbor, Fla., contained in the fortification appropriation act approved March 3, 1909, and from the appropriation for the repair and restoration of batteries and other structures appurtenant to the defenses of Pensacola, and retaining walls to protect the batteries from floods, contained in the fortification appropriation act approved May 27, 1908." Would you say the same as to the expenditure of that money as you did in regard to the item above?

Gen. WEAVER. My impression is that if this money is allotted we can use it there. but it would be better to make it available for use where the need is most urgent, and not make it available for any particular locality.

Mr. SHERLEY. The reason, then, for suggesting the expenditure of the money at this particular place is simply because the balance was available for work that had been done at that place?

Gen. WEAVER. That apparently is the reason.

PURCHASE AND INSTALLATION OF SEARCHLIGHTS, MOBILE, ALA.

(See also p. 44.)

Mr. SHERLEY. Now, the next item relates to the expenditure of some balances for the defenses of Mobile, Ala. You would think the same condition applied as to that?

Gen. WEAVER. In looking over the statement it seems to me to be practically the same proposition—the same principle applies.

PRESERVATION AND RETENTION OF THE FILL OF THE FORT CROCKETT
MILITARY RESERVATION.

(See also p. 44.)

Mr. SHERLEY. The next item is as to the preservation and retention of the fill of the military reservation at Fort Crockett, Galveston, Tex. How badly needed is that?

Gen. WEAVER. That fill, I think, is rather urgent. The question of the health of the command is involved and also that of the civilians in the vicinity. There is a surplus left, I understand, from the fill at Fort Travis, across at Bolivar Point; the money was allotted for the purpose of filling there, and the proposition is to authorize the balance to be expended in filling in at Fort Crockett.

Mr. SHERLEY. I notice authorization is asked to acquire land. What land is it thought will be necessary, and what would be the cost of it?

Gen. WEAVER. There is a body of fine land back of the fortifications there that would be useful, perhaps, in the future for general rendezvous purposes; I do not think it has any direct utility in connection with the fortifications.

Mr. SHERLEY. Is it necessary in order to do the work for the preservation and retention of the fill?

Gen. WEAVER. I do not think it is; I am not quite sure about that; I have not visited that particular locality. Perhaps Capt. Embick knows about that better than I do.

Capt. EMBICK. My understanding is that in order to preserve the present fill it will be necessary either to build the retaining wall or to make the fill in behind the present fill. The land on which the fill is to be made is now private property, and is not necessary for general fortification purposes, and the city of Galveston, I understand, will give permission to make the fill on this land, whether the Government acquires it or not.

Mr. SHERLEY. Have you any estimate as to what this will cost?

Gen. WEAVER. I understand that the saving from the Fort Travis and Fort Crockett appropriations will be sufficient probably to accomplish it, but not to purchase the land.

Mr. SHERLEY. Do you know what the amount of that is?

Gen. WEAVER. I asked for that information this morning, and it was said to be about \$80,000.

Mr. SHERLEY. This condition is the same as has existed there for some years?

Gen. WEAVER. I do not think it has existed for some years; it has only existed since the present fill was made. At the time of the flood, you know, that reservation was badly cut to pieces, and the site of the post had to be filled in before the post could be constructed.

Mr. SHERLEY. That was some years ago?

Gen. WEAVER. The flood was in 1900. A lump sum was made for the restoring of the fortifications. The fill was made about two or three years ago, I think. Fort Crockett has only been occupied by a garrison since last July.

Mr. SHERLEY. Has it been determined whether the improvement will be made by a retaining wall or by extending the slope?

Gen. WEAVER. I do not think it has been determined as to which of the two shall be followed.

Mr. SHERLEY. What difference in cost would there be?

Gen. WEAVER. I do not think there is a material difference. The advantage in favor of the fill is that it would remove a body of stagnant water there which is insanitary.

Mr. SHERLEY. Will it be possible to give us some definite figures? It is rather loose legislation to simply authorize a balance to do work the cost of which we do not know.

Gen. WEAVER. If you like, I will put that in when I revise my hearing; I will put in all I can get on that subject.

Mr. SHERLEY. I wish you would fill in just what the plans will be and just how much will be necessary of the balance referred to; also state how much less the cost would be if we excluded the purchase of any land.

Gen. WEAVER. Yes, sir.

[NOTE.—Complete data as to costs and balances in connection with this item will be found in the printed report of the hearing before the committee of Col. Burr, of the Corps of Engineers, page 45. The purchase of the land is not necessary for carrying out the project, as the land is not required for military purposes, and the Attorney General has decided that, under the permission granted by the local authorities, the United States can make the fill without acquiring the land.]

DEFENSES OF KEY WEST, FLA.

(See also p. 48.)

Mr. SHERLEY. The next item is for a direct appropriation of \$36,000 "For repair and restoration of structures appurtenant to the defenses of Key West, Fla." What is the condition there?

Gen. WEAVER. There is a wharf there that was partially destroyed by a hurricane. Nothing can be done in the way of utilizing the wharf until it is restored.

Mr. SHERLEY. As I recall it, the end of the wharf was left more or less intact, whereas the connecting portion of the wharf was washed away?

Gen. WEAVER. Yes, sir. The estimate is \$36,000 to restore the wharf.

Mr. SHERLEY. Is that a detailed estimate as to the cost?

Gen. WEAVER. A detailed estimate.

CAPE HENRY, VA., PURCHASE OF LAND.

(See also p. 26.)

Mr. SHERLEY. I think that concludes the items in which you are interested. However, there is another matter about which I want to ask you. There is an estimate for the purchase of some land at the lower part of Chesapeake Bay, the estimate amounting to \$150,000. We have been informed that that contemplates the purchase of some 300 acres of land. What is the need for that quantity of land?

Gen. WEAVER. That is the land that is needed for the fortifications and garrison or for the post that will be built there when the batteries are constructed and the armament emplaced.

Mr. SHERLEY. Well, assuming that a post would not be there, how much land would be needed. I mean a post for the garrisoning of troops permanently.

Gen. WEAVER. It depends entirely on how much land is required for the fortifications.

Mr. SHERLEY. Well, assuming that a post was not built there and that no land was needed other than that necessary for the fortifications proper.

Gen. WEAVER. It is such an important point and is so removed from centers I think troops will always have to be located there.

Mr. SHERLEY. Would there be any need to locate troops there other than in time of war?

Gen. WEAVER. I should consider it one of our most important defenses and one that ought to be garrisoned at all times; that is my own personal view.

Mr. SHERLEY. In point of fact, are we not rather overloaded with posts for the Army?

Gen. WEAVER. I would advocate the abandonment of some Coast Artillery posts and placing our troops elsewhere.

Mr. SHERLEY. Unfortunately, the abandonment of existing posts and the creation of new ones does not result in any particular economy to the Government of the United States.

Gen. WEAVER. I do not know about that, but if it were possible to sell some of the land that we now have and put the money into posts elsewhere it would be in the interest of coast-defense efficiency.

Mr. SHERLEY. General, in your judgment, would it be desirable to abandon some of the existing seacoast forts, in view of the fact that you are asking that the purchase of land at Cape Henry be sufficient to establish a post there?

Gen. WEAVER. Yes, sir.

Mr. SHERLEY. There has been no submission by the War Department of any plan having in mind the abolishment of certain posts and the creation of others?

Gen. WEAVER. None to my knowledge.

AMMUNITION FOR SEACOAST GUNS.

Mr. SHERLEY. General, under the Ordnance Department come the estimates as to ammunition for seacoast practice. Do you contemplate doing the same amount of practice that you have done heretofore?

Gen. WEAVER. We are starting out this year on a more advanced line in target practice than ever before and shall try to simulate real war conditions more nearly than ever before. We plan to have fire command practice and battle command practice, which has not been attempted before. This one item of ammunition for target practice means more than any other; it measures our efficiency for war service. I hope you will give it precedence over everything else.

Mr. SHERLEY. The condition of the reserve ammunition for the seacoast cannon in continental United States is, generally speaking, satisfactory?

Gen. WEAVER. Yes. We have recently developed a new projectile, one having a longer point, and it is quite desirable especially to accumulate some of them. I think the estimate is \$140,000 for this purpose.

Mr. SHERLEY. The reserve that has been in contemplation has been, I believe, a reserve sufficient for continuously firing all of the guns on one coast for two hours?

Gen. WEAVER. Yes, sir; I think that is the basis of the reserve ammunition estimate.

Mr. SHERLEY. Of course, in point of fact, there never would arrive a situation where even a majority of the forts on one coast would be actually engaged in repelling an attack?

Gen. WEAVER. Of course not; but there might be some places where they might be engaged longer than that time.

Mr. SHERLEY. Well, in point of fact, is it not true that the very preparedness for attack eliminates the probability and almost the possibility of such an attack?

Gen. WEAVER. That is, I think, one of the strong elements of coast defense. We have such efficient coast defenses, such fine guns, such splendid fortifications, our personnel is so highly trained and gets such remarkable results at target practice, I think these facts will deter almost any naval power from attacking us, but these very facts entail the necessity of preserving all of the standards of efficiency.

Mr. SHERLEY. The history of the Japanese-Russian War indicated, particularly Port Arthur, that where a fortification was well equipped and supplied a naval attack would be abandoned; and, if it was necessary to attack a place, that attack would be by land rather than by sea?

Gen. WEAVER. Yes. The Japanese at Port Arthur gave very respectful consideration to the fortifications there, and those fortifications are not comparable to ours, either as to the caliber of guns or efficiency of fire.

Mr. SHERLEY. You do not think, then, that there would be any great probability of an attack on any of our chief fortifications?

Gen. WEAVER. I think that on account of their efficiency no naval commander would venture to do it unless there were some special conditions that would require him to endanger his ships.

TUGS.

Mr. SHERLEY. Tugs used for artillery purposes are estimated for out of what appropriation?

Gen. WEAVER. The tugs?

Mr. SHERLEY. Yes.

Gen. WEAVER. There are some boats that are used strictly for artillery purposes—the torpedo planters, so called. They go along the coast giving instruction, and in each artillery district there is what is called the district boat, which tows targets, transports, coast-artillery material and personnel among the posts of the district, and is used for general artillery purposes.

Mr. SHERLEY. Are they supplied from items in this bill?

Gen. WEAVER. I think not.

Mr. SHERLEY. I notice that in your report you state you are in need of a seagoing tug for artillery purposes in Hawaii.

Capt. EMBICK. The estimate for that is not in this bill. It would be a quartermaster estimate.

Mr. SHERLEY. Was an estimate made for it this year?

Capt. EMBICK. It was finally omitted and is not in any bill this year.

FORTIFICATIONS AT SAN PEDRO HARBOR.

Mr. SHERLEY. General, there has been no estimate for the fortifications at San Pedro Harbor?

Gen. WEAVER. We have land there, and it is contemplated building fortifications at that point.

Mr. SHERLEY. But no estimate was submitted at this time?

Gen. WEAVER. No. It is regarded as necessary and desirable, but in view of the limitations placed on us in the estimates we did not include that.

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